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SYMPOSIUM
PRESENT STATUS OF SINUSITIS IN EYE DISORDERS.

RHINOLOGICAL ASPECT.*

DR. DUNCAN MACPHERSON, New York.

In earlier days ophthalmology, otology and rhinology were, owing to the field of each being limited, associated in clinics and practiced in private as one specialty. In those days rhinology was an orphan, and not a respectable one. After the discovery of cocain and discovery of its contractile effect on the nasal mucosa by, I think, Bosworth, rhinology began to step forward. Tonight it is interesting to note that two of the old trio meet again; not because of their continued limitations as divisions of medicine, but because their unfolding has uncovered anatomical and pathological relationships that compel unity of action on the part of the ophthalmologist and the rhinologist, few of whom in large centers find it to the interest of the public to cover both fields.

Many eye diseases and symptoms are directly or indirectly due to nasal pathology and disappear when that pathology is successfully

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treated. Orbital disease may be caused by blocking or infection of the lachrymal passage or by inflammatory extension causing orbital cellulitis. Blepharitis, keratitis, field contractures, asthenopia, scotoma, photophobia, dilatation of the pupil, ptosis, iritis, glaucoma, retinitis are all known to exist with and to be staved, improved or cured by the removal of nasal infections, among which those of nasal sinus disease is a contributor. Eye symptoms associated with adenoids and disappearing upon their removal can very well be due to clearing of the sinus pockets of infection resulting from removal of the adenoids.

But of all the eye symptoms accompanying nasal sinus disease, the one that has caused the most controversy, discussion and interest has been that associated with optic nerve symptoms where swelling of the disc presented and, especially in point of diagnosis, where the swelling was, say three and one-half diopeters and upward. And if it created differences of opinion relative to diagnosis, it naturally created differences of opinion relative to treatment. This difference exists today between the ophthalmologist and rhinologist on one side and some brain surgeons on the other. None of us can but be interested and influenced by any position taken by so eminent an authority as Dr. Harvey Cushing. His ideas can best be utilized by consulting his contributions to the literature.

A few years ago we were told by the microscopes that the pathology found in ethmoidal and sphenoidal tissue removed for the relief of impending blindness differed in no way from tissue removed where no loss of vision or swelling of the disc was present. In fact, it might have been called normal tissue or tissue similar to that found in clinically normal noses, which as a matter of fact, is frequently the appearance of the nasal mucosa in cases with optic nerve swelling, *i. e.*, slight hyperplasia. Dr. Coffin, a good many years ago, submitted microscopic proof of the presence of phlebitis and, selecting his cases, many were successfully treated on that hypothesis, *i. e.*, by suction or the vacuum treatment and by surgical bloodletting in more fulminating cases. The end-results being as satisfactory by suction treatment as by cutting, so long as either type could be followed, which was in both types for years. Bear in mind that he selected his cases.

Last year Dr. Eggston added a valuable contribution to the subject, finding arterial and lymphatic changes, as well as venous. Theoretically, in view of Dr. Eggston's findings, one would feel that suction would be more likely to be effectual in the young before

arterial changes took place. Perhaps Dr. Eggston will dilate on this phase of the pathology.

Two chief etiological factors have their proponents and opponents. One, that of focal circulatory infection; the other, anatomical contiguity of parts. That a small optic foramen was present as the etiological factor, as advanced by the late Dr. White, of Boston, is, I believe, not accepted unless in exceptional cases. Small nerves and small foramina might well go together. It would seem that cases formerly listed as due to anatomical contiguity could be due to focal infection if we admit that the vascular changes could be due to focal origin, distal or proximal.

Relative to treatment, there are those who advocate exenteration of the ethmoids and opening of the sphenoid in all cases. There are those who advocate the treatment of each case on its merits; also, there are those who say that most cases should be left alone because they will get well spontaneously. There are those who ventilate the anterior ethmoidal cells. Those who ventilate the posterior cells or both and some resort to suction, but it is worth noting that operating is done on the affected side by those who believe in distal foci of infection and by those who believe in contiguity. We are probably all aware of Dr. Osler's dictum to the effect that most diseases tend to get well if left alone. But, too, he believed there was such a thing as art in medicine that could be and was useful in the practice of medicine. In other words, some practitioners had *it*, that imponderable something. Many have much *it* and others less. Added to *it* all should add the scientific facilities of the laboratory and all cases of this kind should have the close co-operation of the oculist who, in these borderline cases should largely influence the decision to resort to radical or conservative measures and, considering Coffin's and Eggston's findings, consulted at intervals for one or two years or more following treatment, especially in the cases treated by suction.

Undoubtedly there are cases of optic nerve swelling that subside perhaps without aperients even, but I doubt if the oculists who claim recovery without interference actually permit the patient to go his way without any treatment; even rest might tend to change vascular conditions or to overcome a low grade infection, and the former is what is accomplished to a more marked degree by suction and to a still more marked degree by so-called ventilation or exenteration.

But when similar results are obtained in such a large percentage of cases by what on the surface appears to be such diverse methods one must feel that there is a common denominator somewhere, and

it is probably the change in the vascular stream, common to all methods quoted.

Radical exenteration is the easiest method for the doctor. It is a rule of thumb. Here lies a ready made treatment for all his cases, and he backs it up with the claim that by such treatment the possibility of later field distortions, optic atrophy, etc., is reduced to a minimum; and such arguments are very convincing. It will seem, however, in view of the results that ensue by following conservative treatment in properly selected cases that it should not be necessary to exenterate the ethmoids of all cases showing three or four diopters of nerve swelling, more or less, etc. Some years ago ice bags and ice coils were used in acute mastoiditis and if at the end of 24-48 hours tenderness persisted, the mastoid was opened. Not many are doing that now; not only because early opening of infected areas before a safeguarding barrier is built up allows infection to enter the blood stream, but because by selection of cases, many recover without operation. One cannot help being influenced by one's own experience, but neither should one exclude from consideration the positive findings of competent observers. For instance, I do not recall having had any cases of optic disc swelling relieved by removal of teeth or tonsils alone, but competent observers have and believe such to be causal factors.

Mrs. S., Oct. 21 and 27, 1926; Jan. 17, 1927; Feb. 22, 1927; Jan. 24, 1928; June 11 and 13, 1928; May 23, 1929; came to me suffering from vertigo and dizziness, and a statement from her oculist that she had about four diopters swelling; a leading neurologist advised decompression, and a leading oculist and rhinologist concurred. Dr. De Schweinitz, of Philadelphia, was unable to differentiate or classify the swelling of the disc, but by standing on his head and after examining the eye at intervals for about one and one-half hours, both he and her New York oculist found an area of choroiditis which pointed, they thought, to focal infection. Her infected tonsils were removed and the ethmoids exenterated and the sphenoids opened. That was in 1927. Her vision is now, or was a short time ago, 20/20 but with scotoma, not central.

Miss H. S., July 6 and 8, 1915: Another patient in which decompression was advised, suffering from vertigo with falling, vomiting, some headache, optic nerve swelling, loss of vision; first seen about 1915. Vision improved by suction to nearly normal. Vision cleared, general symptoms ceased for years. About four years ago, or 11 years later, was taken suddenly ill and I was informed that she

died in a few days from meningitis. I am unable to say whether the meningitis was due to an abscess or that it was a coincidence.

Miss C., treated Aug. 8, 1921; Sept. 9 and 12, 1921; Nov. 4, 1921; Feb. 25, 1924; Sept. 8, 1929; came to me in 1921; another patient in which decompression was advised by an eminent neurologist. The oculist believed the trouble to be sinus in origin and a rhinologist ordered exenteration of the ethmoids. Noting from the history that the case was not progressing rapidly and tests in my office showing marked improvement by suction at the time of the first visit, I considered that form of treatment. She returned for a check-up in 1924 because of a cold. A week ago by telephone she informed me that her oculist (with whom she keeps in touch, and I think all these cases, whether they have exenteration performed or not, should make periodical visits to the oculist, especially in view of the possible progressive vascular changes) tells her her eyes "are normal"; but that her family doctor says she gets sinus trouble when she gets a cold. She planned to come in to see me when she gets her next cold. I have not seen her since 1924.

Jay C., Oct. 1, 1922, about 10 years of age; came in with blindness of one eye unilateral, with about four diopters disc swelling and vision 20/200. After suction, waiting for 10 minutes, using vacuum again and testing, the vision was 20/70. After going back to his oculist I was called by telephone, asking what I had done. I reported and said the vision when he left the office was 20/70. "Well," he said, "it is 20/50 now." He was to return to me in two or three days but his oculist reported instead that the vision was normal, and that he would not need treatment.

Mrs. B., treated June 29 and 30, July 5, 7, 10, 12, 24 and 27, Aug. 3, 6, 13 and 17, and Oct. 4, 1928; came with an urgent appeal from her oculist that she have the ethmoids immediately exenterated. The case was apparently of slow progress. Radiographs showed both antra dark and irrigations brought out clots of pus. Attention to the antra with suction and packs cleared up the eye condition entirely, and yesterday her family physician reported continued normal vision.

Mr. G. H. G., reported Oct. 22, 1930, with a diagnosis of retrobulbar neuritis and was unable to count fingers at one foot. Green pus was irrigated from left antrum and yellow from right; a badly deflected septum that rendered a proper ethmoidectomy impossible, should one be deemed necessary at a later date, was corrected. On Oct. 28 an ethmoidectomy was done. On Nov. 3 the oculist reported

that the patient saw almost as well with the left as with the right eye. In this case, suction and irrigation of the antra were not improving the situation sufficiently and, fearing atrophy, ethmoidectomy was resorted to. The antra were clear on Dec. 8, after a double antrotomy done on Nov. 25. On Feb. 28 a small white, jelly-like clot, the size of one-half pea, was present in the left antrum. The vision and eye condition are satisfactory.

The above are examples of cases, no two of which were treated exactly alike. Some cases, of which these are taken as examples, were treated by suction, some by "ventilation" of ethmoids and sphenoids, some by exenteration, some by antral treatment combined with suction and packs, some by tonsillectomy and ethmoidal exenteration, others by submucous resection, antrotomies and ethmoidal exenteration, and with one exception (that of the case of meningitis) the end-results have been about on a par. Nevertheless, I am satisfied that no two of these cases referred to above should have been treated alike.

114 East 54th Street.

PRESENT STATUS OF SINUSITIS IN EYE DISORDERS.

OPHTHALMOLOGICAL ASPECT.*

Dr. Lewis W. Crigler, New York.

When the writer received the folder announcing this symposium, little did he realize that he should be called upon to take the place on this program of one whose untimely death has left us all with sad hearts. Dr. Thomson died at the height of his career, at an age when many useful and happy years should have been before him, for he was only 59. A great loss has been sustained by this community and the country at large, for he possessed a nation-wide reputation, gained through merit and achievement.

His mental faculties were of a high order. He was intensely interested in every phase of life that was worth while. His home life was ideal—his love and talent for music, coupled with a broad education, enhanced through travel, made him a delightful companion. He possessed to a high degree an alert mind and a retentive memory.

In his chosen specialty he was an inspiration to those of us who had the good fortune to be thrown in contact with him.

His knowledge of the pathology of the eye, combined with a wide clinical experience, and an analytical mind, were the elements which made him an excellent diagnostician. As an operator, he was unexcelled; as a consultant, he was always considerate and just, and as a friend, he was loyal.

For the past 15 years he has probably devoted more time and study to the subject that is before you tonight than any other ophthalmologist in this country.

His conclusions have been drawn from observations gained from a wide clinical experience. My own views have been largely influenced by intimate contact with him and through his writings on the subject.

The time allotted to me for the preparation of this paper has been necessarily limited, and in view of the circumstances, I have deemed it quite fitting that I should quote freely from his most recent exhaustive paper on the subject. To those most interested, I would suggest that you not only read it in full, but study it. If you will

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do so, you will find his views are not as radical as some would lead you to believe. I, myself, have been skeptical at times, and probably have been more conservative in my recommendations, perhaps due to lack of a fuller understanding; but, after all, important truths are slow to make their impression upon the minds of men when not delivered by one of strong conviction. It goes without saying that at times there were failures, and mistakes may have been made, but that is only human.

First of all, he states that it has been conceded that purulent disease in a confined cell, or even in the general cavities, when drainage is insufficient, can and at times, does cause focal infection, or inflammation by direct extension. Probably, in these cases, there is an element of mechanical pressure at first, and finally, extension by the blood or lymph channels. In the case of the optic nerve there may be direct extension through periostitis of the wall of the optic foramen, or pressure from the products of inflammation.

He was firmly convinced that inflammation of the iris, ciliary body and choroid can and does occur, not only as a result of purulent sinusitis, but as a sequela of latent sinus infections. In this latter type he states that the inflammation is not very severe, but tends to run a chronic course, and when the ciliary body is involved, plastic formation is of a very marked degree. When the choroid becomes inflamed vitreous exudates are present; in other words, the picture of a low grade toxemia is produced without sufficient virulence to lead to rapidly destructive nutritional effects. The condition is usually unilateral. One attack may subside, to be succeeded by another and another, each becoming more severe, until the underlying cause is removed, and if the damage already done is not too severe, may result in a complete arrest of all inflammatory symptoms and a partial restoration of function.

He considered it quite important to eliminate all other possible foci as quickly as possible, in order that the sinus operation might be done promptly.

He doubted the existence of retinitis of sinus origin, except as a complication, wherein the optic nerve and choroid are involved as a result of focal infection from ethmoid, sphenoid or antrum disease.

His classification of optic nerve involvement is as follows: First, the nerve may be the seat of plastic inflammation, either singly or acompanied by lesions of the retina and choroid. The nerve head may show a swelling varying from two to six diopters. The margins of the disc are indistinct in outline and the retinal vessels tortuous; later hemorrhages appear near the disc and plastic exudates become more marked. Vision fails rapidly and the blind spot

is enlarged. Peripheral field disturbances do not occur until atrophic changes begin.

His second type he described as that of retrobulbar neuritis of low degree, depending upon the part of the nerve affected. The nerve is slightly white and blurry, with vessel walls not changed or diminished in size, vision is markedly reduced, the blind spot is enlarged and the fields may be contracted; in other words, the picture of a plastic inflammation in the retrobulbar portion of the nerve, with a certain amount of mechanical pressure. Changes in color perception are more common than in the former type and consist of contraction of the color fields and central scotoma.

Both types require early operation if atrophy is not to ensue, the retrobulbar type being perhaps the more urgent.

A third type, and one with which we are all familiar, gives marked functional depression with no change in the appearance of the optic nerve. The pathology in these cases is obscure and while the theory of infection and pressure both have their advocates, it cannot be said that either has been definitely established. Central color scotoma is relatively common in these cases and concentric contraction of the form field occurs, usually after the vision has been depressed for several weeks. As long as the ophthalmoscopical appearance of the nerve is normal, a complete return of function is not only possible, but probable. Atrophy of the nerve eventually ensues if the sinus operation is not done. Recovery of vision after a period of depression lasting sometimes several months makes it difficult to imagine that plastic exudation may be the cause of the process. For if present, it would not clear up so quickly and would certainly result in destructive changes after such a length of time; also, very severe pressure would seem to be precluded, as in cases of demonstrable pressure, enough to seriously cut down function, as in tumor or hemorrhage, atrophy occurs with relative promptness.

RECAPITULATION AND AUTHOR'S REMARKS.

Sinusitis of a purulent nature may produce secondary foci of inflammation in any part of the eye, and is most apt to occur when the pus contained therein is sealed up in the antrum, ethmoid or sphenoid. The inflammation is most apt to affect those structures that seem more vulnerable, namely, the iris, ciliary body and choroid. The retina appears to be more immune to infection except as a secondary involvement from the choroid. It is more probable that involvement of these structures is more often due to apical abscesses of the teeth, tonsils and antrum infection than from the ethmoid and sphenoid, for the reason that the pus is more often confined under pressure.

Conditions affecting the optic nerve, as a result of sinusitis, may be classified, for the sake of clearness, under two main headings: First, and probably the most frequent, is that of a plastic neuritis resulting from a purulent or low grade chronic sinusitis, which extends by continuity of structures, first to the covering of the nerve and thence to its substance, which ultimately takes on the nature of an interstitial inflammation. The ophthalmoscopic appearance of the nerve head and the field changes depend upon the severity of the inflammation, the relationship of the nerve to the sinus wall and the duration of the disease. The more remote the inflammation is from the nerve head, the more normal it appears ophthalmoscopically, while visual disturbance may still be extreme. In the severer forms the nerve head may be swollen, the retinal veins engorged, the arteries tortuous and hemorrhages and exudation may occur in the immediate vicinity of the disc. The blind spot is usually enlarged, the field contracted and relative central scotoma may be present. The impairment of vision may vary from a slight haze to complete blindness. This condition has been repeatedly seen to affect both eyes, and when radical measures have been instituted promptly, to relieve the inflammation, normal vision has returned; but it goes without saying that the greater the delay, the greater the chances are of marked deterioration of vision as a result of secondary atrophy.

The second main classification is that characterized by a purely functional interruption of the visual currents, resulting from an obscure pathology in which neither the pathologist nor the rhinologist are enabled to enlighten us very much. The condition is characterized by an early central scotoma for colors, which may later become absolute; this may quickly be followed by a rapid diminution of peripheral vision until all light perception is lost. The eye grounds usually appear normal and remain so over a long period of time or until simple atrophy sets in. In some instances the vision and fields gradually return without surgical intervention, but recovery is usually prompt and magical within a few days after radical exenteration of the sinuses. It must be recognized, however, that this type of optic neuritis, both in its early stages and in its clinical manifestations, and in ophthalmoscopic appearance, resembles many other forms of retrobulbar neuritis, most of which are toxic in origin, such as are produced by the acute infectious diseases, and various chemical poisons, including alcohol and tobacco.

Diabetes, malaria and autointoxication also have been known to produce this condition. Indeed, numerous other causes are mentioned by various authors.

Disseminated sclerosis is sometimes difficult to eliminate as a possible factor, inasmuch as its symptoms are so fleeting and long drawn out. Then, too, the causative agents in disseminated sclerosis are thought to be equally as numerous and quite similar to those of retrobulbar neuritis, and it behooves one to be ever on guard lest the true cause be not determined.

Wilmer thinks that there may be a causal relationship between the diseased sinuses and disseminated sclerosis, inasmuch as it may be possible for the infectious agent to gain entrance to the central nervous system through the sinuses, and that prompt and radical sinus operative procedure in this country may account for the fact that disseminated sclerosis is less frequent here than abroad. He therefore concludes that even though multiple sclerosis be diagnosed, frankly infected sinuses should be drained since there is but little of specified therapeutic value that can be suggested for the relief of this obscure disease.

In Lebin's disease there is a permanent loss of central vision. It is usually hereditary and may affect several members of the same family.

Most ophthalmologists agree that in the presence of progressive and rapidly failing vision, due to retrobulbar neuritis, where all other foci of infection have been eliminated, the sinuses should be exenterated, irrespective of their normal appearance. There is less unanimity of opinion concerning such radical measures where the uveal tract alone is involved.

Dr. Eggston's interpretation of the histopathological changes in the ethmoid and sphenoid sinuses resulting in the noninflammatory form of optic nerve disturbances is as follows:

As a rule, this consists of a fibrotic or atrophic process in the sinus mucous membrane which usually proceeds from an arteritis or periarteritis, and ultimately fibrosis of these vessels, and the structures supplied with nourishment, associated with a condensing osteitis in many instances. Occasionally the membranes show the combined type of pathology where polypoid hypertrophy and atrophic areas are present. Rarely the sinus mucous membranes show the hypertrophic or polypoid type of membrane, the result of a phlebitis or lymphangitis.

The pathology, being usually of an atrophic nature, accounts for the failure of clinical examination of the sinuses to reveal little or any discernible changes. The redistribution of the circulation by surgical procedure readjusts the blood supply, resulting in better nutrition of the nerve, with restoration of function.

653 Park Avenue.

PRESENT STATUS OF SINUSITIS IN EYE DISORDERS.

SUMMARY.*

Dr. Charles J. Imperatori, New York.

Abstract of Recent Literature[1]: References in the following abstracts are made to include retrobulbar neuritis and to slight ophthalmoscopic alteration of the nerve head and adjacent retina in which the common cause (diabetes, multiple sclerosis, toxic amblyopias, syphilis, etc.) are absent. Gross evidence of sinus disease may also be absent and radical attacks upon the sinuses would not be warranted except for the grave danger of blindness. It is always possible to develop this condition from a purulent sinusitis either directly or from a blood stream infection, giving rise to metastatic lesions in the uveal tract.

"The Causes of Retrobulbar Neuritis,"[2] by Prof. Dr. Richard Scheerer. Out of 64,200 patients examined at the Tuebingen University Eye Clinic, during seven years, from 1921 to 1928, there were 203 cases of retrobulbar neuritis, 0.3 per cent; 134, 66 per cent, were positively due to multiple sclerosis and 11, 5.5 per cent, were probably due to multiple sclerosis—71.5 percent; three, 1.5 per cent, were positively due to accessory sinus disease; 20, 10 per cent, proved to be of diverse origin (nephritis, arteriosclerosis, encephalitis, lues and brain tumor); 12, 6 per cent, due to tobacco and alcohol; 23, 11 per cent, unknown causes. It might be said that these 23 cases were due to nasal sinus disease. However, only three were operated on the nasal sinuses, which were found to be normal, and the others recovered the sight without nasal operation. The author also tabulates all multiple sclerosis cases seen in consultation during the same period. Out of 214 cases 134, 63 per cent, had retrobulbar neuritis, at an early or late stage. The author considers retrobulbar neuritis of nasal origin rare, even if the cases of unknown origin are included, and due only to special anatomic relations between the optic nerve and the nasal sinuses.

Multiple sclerosis is characterized by fleeting symptoms, which is explained by the characteristic feature of the morbid process, *i. e.*, the preservation of the axis cylinder and ganglia cells and the destruction of the medullary sheaths. The nerve fibres passing through an islet of sclerosis appears to be squeezed, their calibre being

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reduced, but their continuity being preserved. In the further progress of the disease, the axis cylinder may become broken up and degenerated. Then the symptoms become permanent. A characteristic early sign of multiple sclerosis is the loss of abdominal reflexes and every patient with retrobulbar neuritis should be tested for the presence or absence of the abdominal reflexes.

Van der Hoeve[3] described the characteristic sign of central scotoma with enlarged blind spot. The scotoma is at first a relative one for colors. One scotoma may appear alone and invade the region of the other.

Regardless of cause, all authorities agree that the sequence of events is too prompt and too definite and too many cases to be merely coincident with operations.

Inflammation in the orbital part of the optic nerve is called retrobulbar or axial neuritis; while the intraocular form is described as intraocular or peripheral neuritis. Systematic writers described two forms of intraocular neuritis. First, true inflammatory or exudative neuritis; second, papilloedema or choked disc. It is important to remember that, as mentioned by Parsons[4], the optic nerve, together with certain parts of the retina, constitutes a lobe of the brain and has further the characteristics of the central nervous system, and, further, the optic nerve is covered by membranes that are continuous with the brain membranes; namely, the dura mater, the pia mater and the arachnoid. Choked disc is commonly conceded to be a lymph stasis with a consequent venous engorgement due to the mechanical pressure on the scleral foramen.

De Schweinitz[5] reports the finding of brain tumor in 80 per cent of his cases, while Uhthoff[6] found that, next to tumor, cerebral syphilis was the most frequent cause. Cushing[7] makes a categorical denial of the possible production of choked disc by sphenoid or ethmoid lesions without intracranial pressure. From time to time this problem has been a subject of controversy.

True or inflammatory neuritis is usually bilateral, with the sight generally much impaired. It manifests itself by no external signs except that the pupils are dilated to correspond with the diminution or absolute loss of vision. It is noted with the ophthalmoscope that the optic nerve and retina show vascular changes at first, followed by exudation and edema and then by infiltration and hemorrhage; later, there is proliferation of the mesoblastic tissues of the vessel walls and neuroglia. The disc outline is more or less poorly defined, reddish or grayish discoloration indicating the presence of exudation in it. The retinal arteries are thinner while the veins are distended and tortuous. Hemorrhages are often present near the disc and the

markings of the lamina cribosa are invisible. Light sense, especially the perception of the light differences, is often much reduced.

Retrobulbar or axial neuritis is the type of neuritis which may be more easily overlooked since the ophthalmoscopic examination may be entirely negative so that early diagnosis must depend upon general examination and frequent field tests. It is well known that the blind spot of Mariotte, first described in 1688, corresponds to that portion of the fundus which has no visual elements, being occupied by the optic nerve as it enters the eye. Pressure upon the peripheral nerve fibres within the canal would involve the peripapillary bundles, with consequent enlargement of the blind spot.

Fuchs[8] thinks that the papillomacular bundle, although centrally located, is first affected because of special vulnerability. Disturbance of its function results in a central scotoma.

McMahon[9] states that chronic sphenoethmoiditis is a distinct clinical entity in which the operative results are attended by a high percentage of improvement or complete recovery (74.3 per cent). His pathological findings are described as follows: Epithelium thickened, sloughing, polypoid degeneration, metaplasia; basement membrane thickening; tunica propria: edema, round-cell infiltration, thickening of blood vessel walls, dilatation or compression of glands; periosteum thickening; bone: osteoblastic activity, osteoclastic activity, hyperostosis.

Ethmoid[10] and sphenoid sinuses alike have suffered from attacks of over-enthusiastic and under-skilled operators. Too frequently nasal operation has been advised when other sources of toxic irritation to the optic nerve—tobacco, alcohol multiple sclerosis, syphilis, teeth, tonsils, gall bladder and the prostate be passed unconsidered. Certain observers have maintained that from 50 to 80 per cent of patients with acute optic neuritis will get well untreated except by ocular rest and proper diet in the absence of a discoverable toxic foci.

Luther C. Peter, in a presidential address delivered a few months before the above article[10] was read by Fenton, said that he was frankly convinced of the desirability of radical operations and cited notable instances of visual fields with defects returning to normal after operation, with a minimum of subsequent atrophy, when operation was done early. Fenton continues and asks what changes in operative procedure have arisen during the past few years. Have the American surgeons become more or less conservative when asked to attack the menace of blindness from the sphenoethmoidal involvement? Has the ophthalmologists' indecision regarding possible benefit from intranasal operations communicated itself to otolaryngologists? Peter suggested a frank conference between the ophthalmolo-

gist, the rhinologist and the patient, in which the dangers should be verbally discussed. If by a process of elimination the usual probable cause of uveitis can be excluded, especially when the ocular tests are unilateral, it would seem conservative exploratory surgery will offer less risks to the patient's welfare than permanently damaged vision. Dr. Mosher, Dr. Skillern, Dr. Beck, Dr. Hurd and Dr. Lynch have recently been kind enough to favor me (Fenton) with personal communications based on their work in this extensive field. They have all seen numerous patients in whom the optic nerve was involved and in whom the visual disturbance was relieved by operation. Mosher, who now rarely operates in this region, cites astounding results of Leon White, stating that the latter always eliminated dental and tonsillar sepsis before attacking the sinuses. Hurd also emphasized dental sepsis, and Lynch the tonsils. None of them found that the medical treatment of the nose gives more than passing help. The observations of European pathologists is that the gross pathological changes are slight, if possible at all. A purulent draining sinusitis is almost never present. Hurd and Lynch remarked on the low intensity of this ethmosphenoiditis, without the pus. Skillern found closed or practically closed cavities and containing an acrid serous secretion rather than pus. Beck found little changes on microscopic examination even in tissue removed in his most startling case, 15 years ago. This patient was led into him practically blind and now has 20/30 vision. He maintained that blockage of a sinus without clinical manifestations is responsible for severe edema of the optic nerve sheath and that operations lessen this dangerous edema. None of these men have ever seen a patient in whom an intranasal operation seemed to make the eyes worse and they agreed that imminent blindness is an indication for radical operation of the ethmoid, the sphenoid, or both, and is a challenge to surgical judgment. Rare though these cases may be, they offer much greater hope of cure than in other sorts of optic neuritis, if diagnosis and operation are not delayed.

Portmann considers that even though the curettement of the cavities apparently show nothing abnormal, the operation is effective through the local blood letting and especially by the aeration of posterior cavities. The warning given by Skillern, "of course, all these things depend upon the astuteness and manual dexterity of the operator, as well as knowledge of the sphenoethmoidal region." To the victim of rapidly advancing blindness, we owe our highest duty as surgeons, realizing humbly that—

> "Oft expectation fails and most oft there
> Where most it promises, and oft it hits
> Where hope is coldest and despair most fits."[11]

Even though the article of Edgar S. Thomson[12] on ocular involvement and sinus disease was published in 1928 in THE LARYNGOSCOPE and read before the Section of Ophthalmology in this Academy, I still feel a review of this will materially dovetail the loose points in such a way that we will get a better understanding of this whole subject. His article is an exhaustive one and should be read and studied. His conclusions are summarized as follows:

Sinus diseases cause iritis, cyclitis, retinitis, choroiditis, in almost as great frequency as they cause optic neuritis. The ophthalmologist should be the one to decide when the sinus operation should be done. Time is of greatest importance as destructive changes in the ocular tissue often take place with great rapidity, but certain clinical pictures in the eye are almost diagnostic of sinus disease and others are so suggestive that, taken in connection with the absence of other causes, a diagnosis of strong probability can usually be made. The dangers of a carefully done sinus operation are not sufficient to justify a temporizing course where the integrity of the eye is endangered. The closest co-operation is essential between the ophthalmologist and the rhinologist. In the vast majority of cases, if treatment can be promptly instituted, the results of operation are excellent. Even in late cases, where a reasonable positive diagnosis can be made, operations should be done as the results are often surprisingly good.

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17 East 38th Street.

MALIGNANT TUMORS OF THE EAR.*

DR. G. ALLEN ROBINSON, New York.

In a recent article Fraser reports 13 cases of malignancy of the ear in a total of 6,600 cases of external ear and meatal infections at the Royal Infirmary. In reviewing the diagnoses listed in the year books of the Manhattan Eye, Ear and Throat Hospital over a period of 20 years, from 1905 to 1924, inclusive, a total of 212,000 ear cases were admitted to the hospital and dispensary, and of these only 48 cases were diagnosed as tumors of the ear. The incidence of new growths of the ear, according to this report, is one in 4,000 cases.

Fig. 1. Typical carcinoma of external ear arising from benign wart.

I should like to report 24 cases that have been referred to me with malignant tumors of the ear. The external ear and auditory canal were primarily involved in 19 cases; in 5 cases the tumor arose in the middle ear, one of which was metastatic. There were 19 males and five females in the series, and the average age was 66 years, the oldest patient being 93 years old and the youngest 28 years old.

The following conditions appear to be etiological factors in the causation of neoplasms of the ear: *1*. Eczema. *2*. Sebaceous cysts. *3*. Papillomata. *4*. Senile keratoses. *5*. Trauma caused by frames of eyeglasses, and chronic irritation of the auditory canal by hairpins. *6*. Chronic ulceration following frostbite. *7*. Chronic mastoid-

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itis with polyps in ear canal. 9. Metastases from malignant tumors of nasal sinuses or elsewhere.

The size of the tumors varied from a few millimeters to several centimeters in diameter, and the cartilage was involved in 14 of the external cases. The majority of the lesions of the external ear were of the basal-celled variety and showed no involvement of lymph nodes. The most extensive case of carcinoma of the external ear is reported as follows:

Miss Mary D., age 68 years, was referred to me by Dr. William A. Scruton for radium treatment on Dec. 9, 1927. The patient stated that her trouble began nine years ago as a small ulceration on the lobe of the ear. The lesion gradually grew larger and since she was afraid of being told she had a cancer of the ear, she did not

Fig. 2. Epidermoid carcinoma of external ear, nine years in duration, before radium treatment.

report her condition to her sister, with whom she lived, nor to the family doctor until the pain became severe and hemorrhage occurred. At the time of admission to the Manhattan Eye, Ear and Throat Hospital the external ear was largely destroyed by the growth, being attached to the scalp by only a small pedicle. There was an ulceration, 5 to 8 c.m. in diameter, in front of and behind the ear. The cancerous process had involved the external auditory canal to the drum membrane. The narrow pedicle which held the fragment of ear to the head was severed, and the laboratory report of the resected ear is as follows:

"The borders of the mass show an indurated ulceration. Sections show the base of the ulcer composed of hyperplastic squamous epithelium with marked infiltration of the deeper tissues involving the cartilage and soft parts. The stroma shows marked mononuclear

reaction. Diagnosis: Epithelioma, chiefly of the basal-celled type.—Respectfully submitted, Dr. A. A. Eggston, Pathologist."

Radium treatments were applied at frequent intervals for more than a year. Approximately 5,000 m.g. hours have been given, using

Fig. 3. Microphotograph of above case showing basal-celled type.

gamma radiation at 2 to 3 c.m. distance. A small 30-m.g. tube has been applied to the external auditory canal.

The patient is now clinically cured of the carcinoma. Scar tissue replaces most of the original growth, although a portion of the mastoid bone is exposed, as well as the mandibular joint.

Fig. 4. Lesion healed three years after radium treatment. Bony structure and mandibular joint are exposed.

MALIGNANT TUMORS OF MIDDLE EAR.

Case 1: Nathan S., age 54 years, was admitted to the Manhattan Eye, Ear and Throat Hospital on March 1, 1928, with a history of

pain and a chronic discharge from the left ear. In his past history, he had measles as a child and pneumonia in 1914. Examination revealed the right ear normal and the left auditory canal was filled with pus and granulations and the walls were sagging. There was distinct tenderness over the mastoid area. A radical mastoid operation was performed by Dr. Charles W. Depping, who found numerous polyps in the left canal. The dura was exposed in the middle fossa, as well as the facial nerve, lateral veins and the synovial membrane over mandibular joint. The mastoid was sclerotic. All granulations and necrotic material were removed from middle area and mastoid cavity. The patient was discharged from the hospital to the clinic after 13 days. No histological nor bacteriological records were made of tissue removed at the time of the operation. The patient reported at intervals to the clinic and was again admitted to the hospital six months later, complaining of severe pain in the left ear, radiating to the left side of face, scalp, cheek and chin. A facial paralysis was advised, but the patient refused. The temperature was practically normal over a period of a week while in the hospital; respirations averaged 20 and pulse 72 to 88. The white blood count showed 11,300, with a differential of 77 polynuclear leukocytes, 17 small lymphocytes and six large lymphocytes. The blood culture was negative.

On Nov. 12, 1928, 250 m.g. of radium were applied at a distance of 3 c.m. for 16 hours over the left ear. On Nov. 20 a 50-m.g. tube was packed in the left ear for 16 hours. There was some relief of pain for a few days following the radium treatment, but the condition could not be controlled.

On admission to the hospital on Dec. 8, 1928, operation was performed as follows:

"Left auricle removed by an elliptical incision. The parotid gland and the several auricular lymph nodes were dissected. The mastoid cavity was filled with a soft mushy growth, which was removed. The vestibule was found to be perforated and dry. The horizontal canal was gone; the cochlea was uncapped and found dry, and the aquaductus cochlea was chiseled across and cerebral fluid flowed out. The entire mastoid and middle ear cavity was packed with iodoform gauze."

The pathological report by Dr. A. A. Eggston is as follows: "The specimen consists of a resected ear with tumor mass and adjacent soft parts, including some salivary gland tissue and lymph nodes. *Microscopically:* Sections show a diffuse infiltration of all the structures with strands of squamous epithelial cells. These cells show

active mitosis, with vesicular nuclei and numerous nucleoli. There is a marked multiplication of cells, with extensive infiltration of the adjacent structures; many of the cells show keratinization. There is marked inflammatory reaction present. The adjacent lymph nodes show involvement by tumor cells. The salivary gland shows no invasion. *Diagnosis:* Diffuse squamous-celled epithelioma."

The patient died one week after the operation.

Case 2: Joseph K., age 78 years, was admitted to the Manhattan Eye, Ear and Throat Hospital on Sept. 5, 1928, with a history of having numerous polyps removed from the right auditory canal, and at the time of the radical mastoid operation by Dr. Depping, on Sept. 6, the entire canal was filled with vascular polyps and facial paralysis was present. The X-ray report showed evidences of previous operations and is as follows:

"The left mastoid has the appearance of being postoperative. The cells in the region between the sinus, posterior canal wall and the tegmen show some evidence of granulations. The right mastoid also has the appearance of being postoperative. There seem to be some cells down near the tip. In the region between the sinus, posterior canal wall and the tegmen there are dense granulations or exudate. The sinus is fairly well back."

The pathological report by Dr. A. A. Eggston is as follows: "The specimen consists of several small irregular fragments of soft tissue and bone. *Microscopically:* Sections show irregular areas and strands of epithelial cells, some of which are squamous, but the majority are rather small round-cell. Many of the cells show active mitosis. There is a rather dense fibrous stroma which divides the cells into nests. *Diagnosis:* Basal-celled carcinoma."

On Sept. 27, 1928, a 30-m.g. radium tube was applied to the radical cavity and 70 m.g. of radium at a distance of 1 c.m. to the preauricular lymph nodes for a total dosage of 2400 m.g. hours. The patient was discharged from the hospital on Oct. 4, 1928, much improved.

Although the ear was in good condition and healing, the patient died four months later from acute uremia, due to prostatic hypertrophy.

Case 3: David S., age 48 years, was referred to the Radium Department of the Manhattan Eye, Ear and Throat Hospital by Dr. Lester M. Hubby on Nov. 20, 1924. The patient had a history of intense pain in the right mastoid region for two years. Four years previous to admission to the hospital he had a mastoid operation performed at the New York Eye and Ear Infirmary on Dr. E. B.

Dench's service and felt well for two years following this operation, when the pain and discharge returned. No biopsy report was made on material removed at first operation. In the Manhattan Eye, Ear and Throat Hospital three operations were performed. The right side of the face became paralyzed in March, 1924.

From Nov. 20, 1924, to Feb. 26, 1925, 2500 m.g. hours of radium were applied to the radical cavity with some relief in pain and a decrease was noticed in the discharge.

The pathological report in this case revealed chronic osteomyelitis and squamous-celled carcinoma infiltrated in bone.

Case 4: Joseph C., age 52 years, a patient of Dr. Birt L. Browning in Newburgh, was first seen by me on March 5, 1929. During childhood there were repeated attacks of O. M. P. A., and at the age of 10 years a curette was used by the family doctor, supposedly to make a larger opening for drainage. The right ear, however, continued to discharge for more than 40 years. When first examined by Dr. Browning, in March, 1928, there was a total absence of drum, granulations occluded the external canal, and a purulent discharge was present. A slight facial paralysis had developed and headaches were complained of in the right parietal region.

A radical mastoid operation was performed June 19, 1928. The findings revealed a large cholesteatoma filling the whole of the antrum, an absence of bony plate in the middle fossa and a large amount of bluish granulations that bled easily were adherent to the dura. A clinical diagnosis of malignancy was made, but again no histological study was done. The lesion might well have been an endothelioma of the dura. At the first dressing there was profuse bleeding, which subsided with the use of adrenalin, but later requiring silver nitrate and packing. One month after the operation a swelling occurred in the zygomatic area, and at the end of six months the auricle stood out very prominently. Due to the increased loss of blood and the growth of the tumor, the patient became anemic and cachectic. Radium therapy was tried in March, 1929, with marked recession of the external tumor masses and a cessation of the profuse bleeding, but diffuse metastases caused death.

Case 5: Tessie R., age 31 years, was referred by Dr. Westley M. Hunt on Aug. 19, 1930, for radium treatment for a primary carcinoma filling right external auditory canal. The patient noticed some pain and stiffness in the right side of the neck early in March, 1930. Iodex was prescribed by the family physician, and in May a gland appeared on the right side just below the ear. One month later facial paralysis developed on the affected side. At this time she

was referred for galvanic treatments. After two months there was no improvement and the nodes in the neck were larger. In the surgical out-patient department of the New York Post-Graduate Hospital, Dr. Louis L. White removed the largest node and obtained a report of squamous-celled carcinoma. He also discovered the primary lesion in the canal. In consultation with Dr. Hunt and Dr. White it was decided to treat the growing lesion with radium, and the metastatic nodes with deep X-ray therapy. The first application of radium was given on Aug. 21, 1930, and consisted of a 30-m.g. tube applied to the canal for two hours. On Sept. 4 six gold radon implants of 1 m.c. each were inserted into the base of the growth, and on Nov. 5 three 1-m.c. gold radon implants were inserted into the base of the growth. Also on Nov. 5, a 5-m.g. plaque was applied for one hour to surface of lesion. The response to deep X-ray therapy for the metastatic nodes in neck has been prompt and decisive. The paralysis on the affected side has now cleared up, and there is no evidence of new growth in the auditory canal.

Summary.

1. More trauma and a greater exposure of the ear to the elements may be reasons for the increased frequency of malignancy of the ear in men than in women.

2. New growth should be suspected in meatal dermatitis not yielding to usual medications. Biopsy should be done.

3. Severe pain, facial paralysis and granulations are symptoms of carcinoma of the middle ear.

4. In five cases of malignancy involving the middle ear none were cured, but considerable palliative relief from pain was obtained by radium therapy.

5. Seven of the 19 cases of carcinoma of the external ear and auditory canal are clinically cured three to seven years after radium treatment; one is well six years after electro-dessication. Six recent cases are doing well and should be cured. Four cases involved the external auditory canal and did not respond to radium treatment, but one recent case treated with gold radon implants is now free of the disease, but the time elapsed is not sufficient to report a permanency of cure. In this case metastatic nodes in the neck have yielded to deep X-ray therapy.

120 East 75th Street.

A SYNDROME OF AVELLIS VARIATION: CASE REPORT.†

Produced by an Angiomatous Polyp in the Outer, Middle and Inner Ears, Involving the X, XI and XII Cranial Nerves.

Dr. Edmund Prince Fowler, New York.

The syndrome of Avellis is manifested by paralysis of the soft palate and the vocal cord, and partial paralysis of the constrictors of the pharynx and the esophagus (ipsilateral to the lesions).

In typical cases there is also found: *1.* A contralateral loss of pain and temperature sense of half the body below the interauricular line. *2.* The retention of all other somatic sensibility in the areas showing pain and temperature defects. *3.* Chronic endarteritis. *4.* The absence of all other motor and sensory disturbances.

My attention was first called to this syndrome by an article by Imperatori[1], in which he describes the anatomic and pathologic bases upon which the syndrome and its variations are founded. He reported three cases and stated that the symptom complex was recognized by neurologists and laryngologists as an entity. "It is caused by hemorrhage (or thrombosis) in the area of the nucleus ambiguus and the spinal fillet in the medulla and may be produced by cerebrospinal syphilis, tuberculoma or syringomyelia." All of Imperatori's cases were women past middle life and most of their symptoms cleared up in a few weeks.

He mentions three variations of the syndrome, as follows:

1. (Schmidt) in which there is added a lower motor neuron paralysis of the sternomastoid and of the vocal cord (nucleus ambiguus and accessorius).

2. (Jackson) in which there is added a lower motor neuron paralysis of the vocal cord, half of the tongue and half of the soft palate (nucleus ambiguus and nucleus hypoglossus).

3. (Tapia) in which there is added a swaying and lateropulsion to the right, loss of sensibility of right side of face and loss or decrease in pain and temperature sense on the left side (for a right-sided lesion in the medulla) (post. inf. cerabellar artery). Also paralysis of the right half of the soft palate and tongue and right

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vocal cord. There is an involvement of the spinocerebellar, the spinothalmic and the descending trigeminal tracts, together with the ambiguus and the vestibular nuclei (nucleus ambiguus and n. hypoglossus).

The lesion in all three of these variations of the Avellis syndrome is ipsilateral. Imperatori gives a long list of lesions for differential diagnosis.

I wish to report a case showing many of the motor symptoms mentioned above, particularly those in the Schmidt and Jackson variations. It is to be noted that none of the sensory phenomena were present and that therefore the lesion or its situation, or both, must vary from any described.

Oct. 16, 1930: Mrs. F. T., age 50 years, no children; husband well.

Family History: Apparently has no relation to present illness.

Previous History: Severe bronchial asthma for seven years, worse at night and 2 and 3 a. m. all winter. This year also in summer. Reacted to many species of irritants. No trouble with left ear. Three years ago noticed the right ear was becoming slightly deafened. This progressed (rapidly?) until it was stone-deaf one-and-a-half years ago (inflation treatment). Seven months ago noticed difficulty with speech and that the voice would break when she attempted to sing. No pain in throat. Four months ago began to have pain off and on in the right ear and running down into the shoulder.

Headache for the past six weeks over the right eyebrow (never before). Remembers that for a year or so she could not descend stairs without holding on to the banisters. For the past six weeks vertigo has been marked (direction uncertain, walks normally, has never fallen). Following recurrent pains in the right ear, there has been at first watery and then pure bloody discharges. Packing was necessary to stop two of these hemorrhages. During this time also the voice has been very husky, but the bleeding would improve it some.

Otological Examination: Came to clinic for pain (from furuncle?) in right external auditory canal. This was packed with cresatin and three days later the right external auditory canal was seen to be completely filled by a firm polypoid growth, around which oozed a thin, bloody secretion. Left ear: hearing for the lower tones and appearance near normal. Some progressive loss as the scale is ascended. Right ear: stone-deaf when masking used in opposite ear.

Fistula test negative: Caloric impossible on account of polyp in external auditory meatus (later proved negative). Rotation to right, 17°; to left, 14°. All blood tests negative. Red cells and hemaglobin

somewhat diminished. White, 7,200; polys., 52 per cent; small lymphs., 42 per cent; large lymphs., 5 per cent; eosin., 1 per cent; vol., 38/62. Blood chemistry within normal limits. Blood pressure, 80-120. Temperature normal.

Roentgenogram shows a 4+ shadow within the right mastoid cells and absorbed areas throughout lower half of the mastoid process. Mild involvement of both frontals and a marked involvement of the left maxillary sinus, with marked edema in the ethmoid bony septa. Chest shows many calcified glands in the right hilus and slight bronchial thickening throughout the right lung.

The right vocal cord appears paralyzed and the uvula, palate, trapezius and sternocleidomastoid muscles on the right side show distinct weakness. When the tongue is protruded it deviates markedly to the right with fine right lateral posterior fibre fibulations during the effort. It can be moved, however, equally well to the right and left side of the mouth even while protruding. Neurological examination by Dr. E. G. Zabrisky (with above exceptions) negative except that the right ankle tonus was greater than left, and that Babinski on right side was doubtful. Sleeps well, appetite good, no headaches, has lost eight pounds in last two weeks.

Comment of neurologist: "In view of history of relief following the bleeding and the marked bone involvement and polypoid degeneration, the interpretation must be pressure upon the nerves with possible extension of the polypoid mass into and along the dura."

Operation disclosed large pneumatic but brittle cells above, and more involved in the tip and with softer walls. Only occasional hemorrhagic areas and granulations. Dura over tegmen appeared healthy. Sinus plate intact except in the tip. There was a soft area in the posterior bony meatal wall, into which the canal polyp extended without attachment to a necrotic softening of the sinus plate low down in the wound. Removal of this area revealed bleeding sinus granulations. On removing posterior bony and meatal membranous canal walls, a large vascular polyp was exposed and removed by a snare high up in the middle ear, from which location it appeared to spring. Profuse bleeding prevented further operative procedures near the middle ear other than the wide opening of the antrum and the removal of the bridge. At this time, although there had been no undue force used, the entire remains of the posterior wall was discovered to be loose, like an early sequestrum of bone. It was removed with several smaller fragments, after which it appeared that the whole anterior and inferior bony canal walls were also freely movable and it seemed that the sequestrum must involve the Fallopian canal. Movement

of the mandible caused marked movement of these bony walls, but no manipulation appeared to cause any stimulation of the facial nerve. It was impossible to complete the separation of this movable bone because of the repeated and profuse hemorrhage from the jugular bulb and it was decided to leave the sequestrum *in situ*. The usual radical flap was made and firm iodoform packing placed over the polyp root and the bleeding jugular. The posterior wound was left open below and moist dressings applied. Immediately following consciousness, an almost complete right facial paralysis appeared. This has slowly and almost completely disappeared.

Subsequent history uneventful except for hemorrhage from the polyp stump during the first few weeks following the operation. Controlled by a saturated solution of silver nitrate and packing. The patient has regained health, swallows normally and can speak much more clearly than before the operation, although paralysis is still to be detected in the soft palate, tongue and right vocal cord.

Dr. Law will discuss lantern slides of Roentgenograms of this case, one taken before the operation and one taken postoperative, the latter showing the enormous loss of bone shadows.

Dr. F. M. Law demonstrated lantern slides of the case.

Mrs. F. T.: The pathologist, Dr. Andrew A. Eggston, reports:

Macroscopically: The specimen consists of a firm, ovoid hemorrhagic mass of tissue, 2 x 1 c.m.

Microscopically: Section reveals a thin surface of squamous epithelium. The basal layer of which is edematous and somewhat irregular in outline. The subepithelial tissue consists of a dense cellular stroma with numerous blood and lymph vessels.

The stroma is trabeculated and surrounds variously shaped and sized areas of fibrillated spindle and round cells which form no definite histological structures. A few of the cells show mitosis. The cells have definite fibrillae and a clear vesticulated nucleus. The spaces in which the cells lie appear to be surrounded by endothelial cells.

Diagnosis: Angioendothelial sarcoma. Culture from the mastoid tip showed a few scattered bacteria. Culture from the antrum was practically negative.

Clinical Diagnosis: Malignant angiomatous polyp springing from inner ear or roof of middle ear, probably involving the dura. Also necrosis of the bony meatus over the jugular bulb and lower sigmoid sinus, due to pressure of the polyp and infection at some time by way of the mastoid antrum or the posterior meatus wall, or both. Paralysis of the cochlea and vestibular divisions of the eighth cranial

nerve. Pressure upon the tenth, eleventh and twelfth cranial nerves in or near the jugular foramen, or their exit from the medulla, all ipsilateral to the lesion. A syndrome involving the region of the lateral surface of the medulla oblongata. In the case reported, an angiomatous polyp probably malignant (syndrome of Avellis variation).

COMMENT.

This case varied from the typical Avellis syndrome by:

1. Insidious onset.

2. No change in pain or temperature sensibility.

3. No chronic endarteritis.

4. No apoplexy or high blood pressure.

5. No cerebrospinal syphilis, tuberculoma or syringomyelia.

6. Paralysis of the posterior fibres of the genioglossus muscle.

7. The presence of an angiomatous polyp.

8. Involvement of both divisions of the eighth cranial nerve.

9. Involvement of the tenth, eleventh and twelfth cranial nerves.

10. No involvement of the ninth cranial nerve and no sensory phenomena.

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114 East 54th Street.

BILATERAL PARALYSIS OF THE FACIAL NERVE, INVOLVING THE AUDITORY NERVE. CASE PRESENTATION.*

DR. PHILIP S. STOUT, Philadelphia.

Miss T., age 17 years, female, single, colored; occupation, school. Graduate Hospital, University of Pennsylvania. Service of Dr. E. B. Gleason. Admitted Jan. 10, 1931; discharged Jan. 28, 1931.

History: Chief complaint, deafness.

Family History: Father, age 47 years, living and well. Mother, age 44 years, living and well. One sister, living and well. No tuberculosis, cancer, diabetes, heart disease or kidney trouble in family known.

Previous History: Measles at the age of 7 years; chickenpox, whooping cough, mumps; "bilious fever" at the age of 9 years; "summer grippe" at the age of 13 years. No operations. No accidents or injuries. Menstruation, age 13 years, April, 1928. Dysmenorrhea, January and September, 1930. Exposure, June or July, 1930.

History of Present Condition: Dec. 24, 1930, patient picked in her ears with a hairpin. On or about the twenty-seventh, when out in the cold, patient had a severe pain in the right ear and a less severe pain in the left ear. The pain in the ears continued at intervals during the following days, being worse at night. Five days before admission to the hospital she began to notice deafness and vertigo, some tinnitus (buzzing sound). At the time it was noted that there was a weakness of the left side of the face. Three days later "could not control lower lip" (relaxed). Pain continued up to time of admission to hospital. Smell not impaired. Sight average, no diplopia. No numbness of face, no trouble biting. Facial weakness bilateral. Impaired hearing most marked on right. Vertigo and tinnitus (buzzing in right ear). Taste not impaired. Swallows without any difficulty. Rash over body began late in October, early in course it appeared on face. Is still present as pigmented maculae. No headache. Sleeps better during the day than at night. Weight loss? Cardiopulmonary: No palpitation, no dyspnea, no cough. Gastrointesti-

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nal: Poor appetite since shortly after Christmas. No nausea or vomiting, bowels regular. G. U.: No dysuria.

Physical Examination: Patient is a young colored girl resting quietly in bed in no evident discomfort. Well nourished and well developed. Skin is of good turgor. Fat, moderate amount, normal distribution. There is a generalized, small macular dermatosis, most marked over abdomen, least on face, hands, feet and over vertebral column. Unable to wrinkle forehead or move facial muscles.

Ears: No discharge, no mastoid tenderness.

Nose: Both middle turbinates in contact with septum (upper anterior), mild serous discharge with some reddening of mucous membrane (bilateral).

Eyes: Pupils eccentric, slightly oval in shape, moderately dilated, react promptly to light, O. M. normal, convergence normal, sclera and conjunctiva clear. Incomplete closure of lids on both sides.

Mouth: Teeth in fair condition. Tongue, slight coating, protrudes in midline, no tremors. Tonsils small, not inflamed. No postnasal discharge noted. No mucus patches noted

Neck: No abnormal pulsations. Submaxillary glands palpable on both sides.

Chest: Well formed. Breasts firm, no nodules. Expansion good and equal.

Lungs: Percussion note resonant throughout. Breath sounds physiological. No räles heard.

Heart: Not enlarged. Normal position. Sounds of fair quality. No murmurs heard. Pulmonics>Aortics.

Abdomen: Wall, good tone. No organs or masses palpated. No tenderness elicited.

Extremities: Right epitrochlea barely palpable. Tendon reflexes normal, possibly slightly greater on right than left.

Tentative Diagnosis: VII and VIII nerve paralysis. Secondary lues: (2° syphilis:) Luetic meningitis at pontine angles. Chronic mastoiditis, bilateral. Poliomyelitis of bulb.—Dr. J. H. Taiffner, Interne.

Temperature, pulse and respiration during 17 days in hospital were about normal.

Neurological Examination (Jan. 12, 1931): Patient gives a history of an acute onset of trouble, apparently of an infectious nature, extending over a period of about one week, until full development of her symptomatology.

Objectively, she shows a definite weakness of masseters on both sides with a preservation of internal pterogoids. A possible abducens

weakness on the left side, a bilateral peripheral facial weakness with inability to wrinkle forehead, close eyes, puff out cheeks or whistle. In addition there is a decrease in hearing, bilaterally, left more than right. Possibly some decrease in movement of palate and pharynx. There is a peripheral twelfth nerve condition also, cannot extend tongue beyond lips and there is a fine fibulary tremor of the tongue. Taste not tested. Corneal reflexes present and sensation intact over face.

Extremities show no evidence of wasting or fibulary twitching—muscle power is good. There is no dysergia or inco-ordination. No Brudzinski or Kernig could be demonstrated. The biceps and triceps reflexes are moderately active, patella and achilles active and equal. No ankle clonus or Babinski.

Impressions: Patient has an involvement of fifth nerve on both sides implicating motor portion of nerve. Possible slight sixth on left side, bilateral seventh and eighth, possible slight tenth and bilateral twelfth nerve involvement. I think the process is in the nature of a poliomyelitis or polioencephalitis implicating the nucleii at the base of the brain. Process is probably of an infectious nature and laboratory examinations are of importance to determine the type. The process does not appear to be a basilar meningitis but this must be ruled out.—Dr. Alpers.

Skin (Jan. 14, 1931): Nothing present but pigmented remains of some previous generalized eruption. May have been bacillary or possibly a secondary syphilis. I would suggest giving 100 m.g. of bismuth intramuscularly to note effect on her general condition.

Jan. 19: Advise injection of 100 m.g. of bismuth intramuscularly every five days at present and continuation of K. I. Later she may receive some arsenicals but not at present.—Dr. C. S. Wright.

Eye: Some drooping of left upper lid compared to right side. Bilateral lagophthalmos, more marked on left side: no ptosis: no exophthalmos: conjunctivae and corneas clear: pupils round, left about 4 m.m., right about 5 m.m., right reacts to light, the left reacts very sluggishly, even more so than the right: convergence up to 6 c.m., at this point the left eye turns outward: ocular movements full: tension. Visual fields about normal.

I Examination, Fundi: Media clear, discs oval vertically, well defined margins, central physiologic cups with prevascular sheaths extending onto surface from physiologic cups.

II Examination, Fundi: Slate-colored: vessels normal; maculae and periphery normal. Fundi will be examined again under mydriotic

III Examination, Fundi: Media are quite clear; discs oval, long axis oblique; margins are definitely distinct; cups not filled in; vessels tortuous throughout, not unusually engorged; both maculae and periphery appear negative.—Dr. Peters, Dr. Spaeth and Dr. T. V. Farborg.

Ear: On Jan. 10 all caloric and turning tests were entirely negative, marked deafness, bilateral, Romberg negative, no vertigo, no nystagmus, no nausea. Some sensation of objects moving up and down in front of her. Jan. 21, some weakness of the seventh nerve on right side. Cannot wrinkle forehead. Pupils react sluggishly to light. The right eye reacts better to light than the left.

Functional Examination (Jan. 21, 1931), after one dose of bismuth 100 m.g. intramuscularly (K. I. by mouth):

Right		*Left*
10 ft.	Conversation voice	20 ft.
6 ft.	Whispered voice	7 ft.
14 in.	Watch	2 ft.
	Weber —>	
Normal	Schwabach	Normal
+	Rinné	+
None	Spontaneous nystagmus	None
Negative	After-turning nystagmus	Negative

No vertigo after turning rapidly 20 times. No past pointing.

Laboratory Tests: Urine (Jan. 12 and Jan. 19, 1931): With the exception of low specific gravity, 1.005-1.008, the results of the tests were normal.

Blood Test (Jan. 12, 1931): R. B. C., 4,800,000; W. B. C., 7,100; hemoglobin, 80 per cent; polymorphonuclears, 69 per cent; large lymphocytes, 31 per cent. Jan. 11: Kolmer, moderately positive: Kahn, doubtfully positive. Jan. 14: Kolmer, 33+(—) strongly positive; Kahn, 11 doubtfully positive. Jan. 12: Special chemical examination of blood: Sugar, 87; urea, 10; carbon dioxid combining power, 50. Jan. 15: Cerebrospinal fluid. Lymphocytes, W. B. C., count 10. Too many R. B. C. for accurate count. Globulin, + with R. B. C. removed. Sugar, normal. Kolmer-Wassermann reaction, 4+(—) (moderately positive). Colloidal gold reaction, 4553311000. Chlorids, 700 m.g. per 100 c.c.

Jan. 15: Cell count, globulin, sugar, smear and culture (reported from Serological Laboratory): No organisms found.

Examination of patient on March 2 showed complete recovery from paralysis of seventh nerve and improvement in fifth nerve,

nearly complete recovery in cochlear branch of eighth nerve but no return of function of vestibular branch of eighth nerve.

Summary: This case represents a condition in which there was rapid loss of function of the motor and sensory nerves following an exposure some six months before. Had there been no treatment instituted for several months more it is a question just what the outcome might have been, probably a permanent disability. However, with the treatment of bismuth injections for the past six weeks—she did not return as often as requested or more treatments would have been given—(three injections), she already has made a fair recovery, with the exception of the vestibular branch of the eighth nerve.

I take great pleasure in presenting the patient.

269 S. 19th Street.

THE AMERICAN BOARD OF OTOLARYNGOLOGY.

An examination was held in Los Angeles, May 27, 1931, during the session of the Pacific Coast Society. Seventy-seven candidates were examined, of which fifteen were conditioned or failed.

An examination was also held in Philadelphia, June 8, during the meeting of the American Medical Association. Ninety-eight candidates were examined, of which eight were conditioned or failed.

The Board will hold an examination in Indianapolis, Sept. 12, just preceding the meeting of the American Academy of Ophthalmology and Otolaryngology, which will be held at French Lick, Sept. 14 to 19. Prospective applicants for certificate should address the Secretary, Dr. W. P. Wherry, 1500 Medical Arts building, Omaha, Neb., for proper application blank.

DR. H. P. MOSHER,
President.

DR. W. P. WHERRY,
Secreary-Treasurer.

END-RESULTS IN 20 CASES OF PRIMARY SKIN GRAFTS IN RADICAL MASTOIDECTOMIES.*

DR. DANIEL S. CUNNING, New York.

The cases shown here tonight are radicals, operated at the Manhattan Eye, Ear and Throat Hospital during the past three years, and skin-grafted by Mosher's paraffin basket mould. During that time, on the four ear services, there have been approximately 50 radical mastoids skin-grafted by this method without any untoward results. As Dr. Mosher says, it is not the purpose of this short paper to argue whether it is better to graft or not, or that a good radical cavity cannot be obtained without grafting. Personally, whenever possible I prefer to graft, and favor the paraffin basket because it is quite easy to make ready; it fits snugly into all parts of the radical cavity and there is practically no long drawn out dressings, as in cases where a graft is not used. Another advantage in using the paraffin is that the skin adheres sufficiently to it to hold it in place so that there is no wrinkling and rolling up at the edges. We also know that epithelium grows well under paraffin and, it seems, actually stimulates its growth.

Several times inquiry has been made of me if it were not dangerous to seal off the cavity, as it were, my inquisitors advancing the argument that this tight fitting mould blocks drainage and invites infection of the sinus or meninges. My reply is that, in our series, we have never met with any such complications, nor have any of the men at the Massachusetts Eye and Ear Infirmary in Boston, where the basket has been used for the past 12 or more years. We do not hesitate to use the graft in the presence of exposed healthy sinus or dura, and even in cases where they are pathologically exposed and covered with granulations, a paraffin basket may be fitted in, left for ten days or so, and at the end of that time cut the skin and insert it.

The only contraindications for the use of the mould is exposed facial nerve or labyrinthitis. After the mould and graft are put in place the patient is under observation for the next 48 hours for any indications of facial paralysis or labyrinthitis, and if any do occur, the gauze packing inside the mould is loosened and, if necessary, removed. We have had three or four cases where it was necessary

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to remove the basket as early as 24 hours, and the graft took very well. If there are no indications of facial or labyrinth involvement allow the basket to stay in from five to ten days—ten, if possible. If there is a profuse discharge with bulging over the skin incision, remove the basket any time after the fifth day.

The technique for applying the graft is taken *verbatum* from Dr. Mosher's original article, from which I quote:

"The present method of making the paraffin gauze basket and the present method of using it are as follows:

"A strip of ordinary surgical gauze is folded on its long axis toward the center twice, making a four-ply tape an inch and a half wide. The gauze tape is dipped into melted household paraffin or parowax. The coating should be thick enough to obliterate the meshes of the gauze. The impregnated tape is rolled up and placed in a sterile container. Ten or a dozen such pieces of tape will last the usual operator a considerable time. These rolls become solid when the paraffin cools. It is generally easy to unwind the roll when it is wanted for use. If it does not unwind readily immersion in warm sterile water will start it.

"Suppose the radical cavity is finished and the operator is ready to cut his graft. The cavity is cleaned and plugged with gauze soaked with adrenalin. This is left in while the paraffin basket is being made. There is a bit of a trick in making the cone. A strip of tape is cut, 6 inches long. This is made to loop over the right index finger of the surgeon, tent fashion, the ends of the tape diverging and making a V. Then the index finger is given a half-turn forward. This results in a spiral twist and the formation of a cone. The twisted cone is then cut free from the tape. In twisting the cone there should be ample overlapping so that the cone can be made wider if necessary. The overlapping edge is smoothed down until the joining disappears and a smooth surface results. When the cone is placed in the radical cavity to make the mould, the overlapping edge is placed posteriorly so that it lies in the bowl. The tip of the cone is filled with melted paraffin for about a quarter of an inch. It is easy to scrape enough paraffin for this from the waste ends of gauze. The object of the solid tip is to make an accurate mould of the middle ear and the region of the aditus. If the meshes of the gauze show on the surface of the cone, the cone should be dipped in melted paraffin. The longer the operator intends to leave the mould in place the more care he should take to have a thick coating, because if the gauze becomes exposed, as it did in one case in which the mould was left in three weeks, the mould changes into a gauze plug,

starts up granulations and defeats the purpose of the whole procedure. The cone made, the adrenalin gauze is removed from the radical cavity and the paraffin cone placed in it. The handle of the ordinary searcher is used to tampon the cone into place and to make it fits all parts of the cavity, especial care being taken to get an accurate fit in the middle ear. If the meatal flap has not been cut this is now done. The writer after much experimenting has returned to the old Koerner flap. In one case after making this flap it was cut off and the result was just as good as in the cases in which the meatal flap was left. The mould made, it is left in place for hemostatic purposes while the graft is being cut. The mould is so easy to make that it is worth while to make a second one, perhaps not so carefully as the first, and to leave this in place while the graft is being cut. It takes a minute at least to arrange the skin graft nicely on the mould and while this is being done the radical cavity more or less fills with blood and has to be wiped out again. By using two moulds this can be prevented. Experience has shown that it is important to have the mould trimmed flush with the surface of the mastoid and not project. If it does it interferes with obtaining primary healing. If a meatal flap is used it is tucked in place back of the mould and the cavity of the mould is filled with ordinary gauze. The mastoid wound is closed for its whole length. If the operator prefers, the lower half of the incision can be left open and a drain inserted. If this is done after the drain and the mould have been removed the unsutured part of the incision falls together and heals promptly. I like to leave the mould in place from five to ten days. As long as the incision does not become puffy or red, in other words, when primary healing goes on smoothly, it is a sign that the mould is well tolerated. If much discharge appears at the meatus, this is a sign that the mould should be removed. As was pointed out before, if the mould is left in long enough for the wax to be melted away sufficiently to expose the gauze the purpose of the mould is defeated.

"When it is decided to remove the mould the gauze which is packed into cavity of the mould is taken out and then the sides of the mould are collapsed upon each other and the mould taken out. Usually the skin graft is left behind and adherent to the sides of the radical cavity. It is a very great satisfaction to see the graft left behind and fitting snugly in place. It is a great contrast to what happens when the gauze plug for carrying the graft is used.

145 East 54th Street.

PARACUSIS.*

DR. DOUGLAS MACFARLAN, Philadelphia.

In presenting the subject of paracusis this evening I feel myself to be in the position of the man who called up his lawyer and asked, "Can they put me in gaol for parking?" The lawyer replied, "They certainly cannot put you in gaol for parking." Whereupon the inquirer said, "But I am phoning from the gaol." Paracusis is said not to exist, and yet I believe the cases here cited are contradictory to this. In recent years the statement has been made by a number of able investigators that paracusis is probably a myth. They find no cases which stand the test of careful hearing measurement with and without the presence of noise[1, 2, 3].

Of course, it is well known that many of the hard-of-hearing still insist that they hear better in the presence of noise.

From my own experience in examining for paracusis, I find that in most cases these deafened are deceived. They hear no better in the presence of noise, and if the noise is loud enough to dampen that to which they are listening, they hear less well. (It must be remembered that a deafened person may not hear a low noise, thus his hearing will be made no worse.)

An acoustic principle that must not be overlooked in all these considerations is the fact that low tones dampen the high tones; only in exceptional cases is the reverse true. Little or no dampening effect is made by the high tones on the low ones. Most of the noises are low and loud; what we usually wish to hear is speech, the important frequencies of which lie higher. A careful consideration to the descriptions given by patients of incidents of paracusis has made me more than suspicious that true paracusis occasionally does exist. One cannot help but be convinced by such statements as the following:

"My classroom is two rooms away from the assembly room. At assembly, with the children singing, I can hear the phone bell in my room. When the children are quiet I cannot hear the bell, and I find that the pupils have to tell me when it rings."

"I can hear the clock tick when the sewing machine is running, but otherwise I do not hear it."

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*Read before the Philadelphia Laryngological Society, March 3, 1931.
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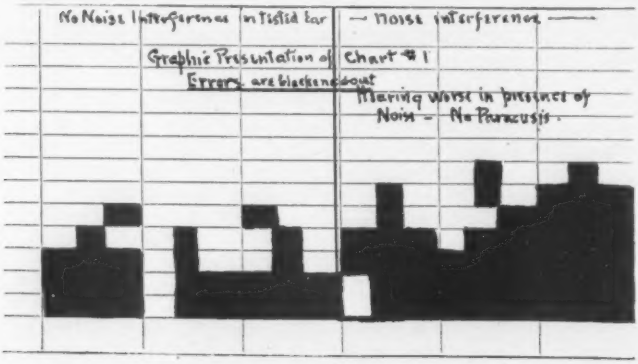
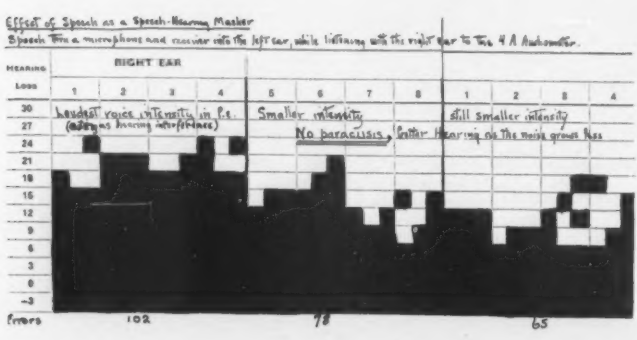
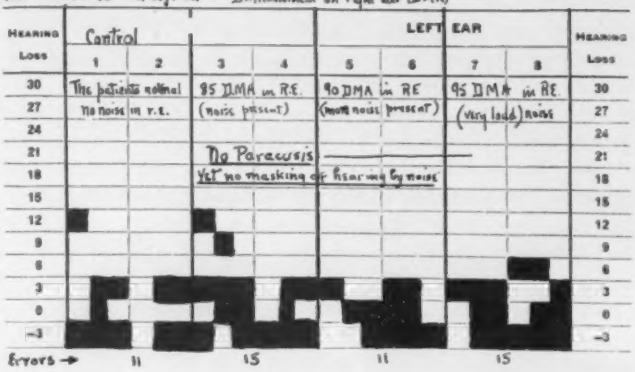
Readings	No Noise interference — In Tested ear — Control			— Noise interference — Weak noise	Stronger noise	V. strong noise
30	526	526	538	526	526	526
28	348	348	363	348	348	348
25	414	419	313	414	414	414
21	111	111	863	111	111	111
18	648	648	338	643	648	648
15	526	526	182	526	5✓6	5✓6
12	826	826	549	8✓6	8✓6	✓✓✓
9	86✓	363	✓51	6✓5	86✓	✓✓✓
6	5✓8	5✓8	518	✓✓✓	5✓✓	✓✓✓
3	✓✓✓	6✓4	515	✓✓✓	✓✓✓	✓✓✓
0	✓✓✓	1✓✓	✓✓✓	1✓✓	✓✓✓	✓✓✓
−3	✓✓✓	5✓✓	✓✓✓	5✓✓	✓✓1	✓✓✓
Errors	11 Errors	6 Errors	9 Errors	12 Errors	14 Errors	19 Errors


No Noise Interference in Tested Ear
Graphic Presentation of Errors are blackened out
— Noise interference —
Chart #1
Hearing Noise in presence of Noise = No Paracusis.

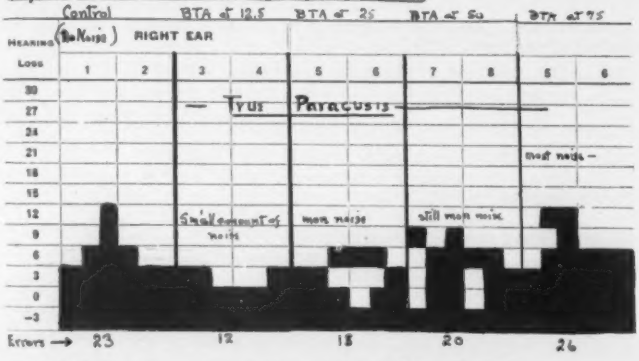


Noise as an interferer in the untested ear

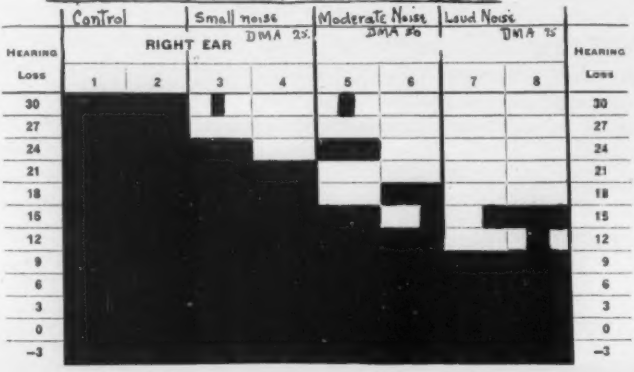
AA - loud receiver on left ear DMA audiometer on right ear (DMA)


Hearing Loss
Control
LEFT EAR
1 2 3 4 5 6 7 8
30 27 24 21 18 15 12 9 6 3 0 −3
This patient's normal
No noise in r.e.
95 DMA in R.E.
(noise present)
90 DMA in RE
(more noise present)
95 DMA in RE
(very loud) noise
No Paracusis
Yet no masking or hearing by noise
Errors → 11 15 11 15

Interference in the same ear with Tone 1024 d.v. in various strengths


Control (No Noise) RIGHT EAR
BTA at 12.5
BTA at 25
BTA at 50
BTA at 75
Hearing Loss
1 2 3 4 5 6 7 8 9 10
30 27 24 21 18 15 12 9 6 3 0 −3
True Paracusis
most noise
Small amount of noise
more noise
still more noise
Errors → 23 12 15 20 24

Interference in the same ear with Tone 1024 d.v. in various strengths


Control
Small noise DMA 25
Moderate Noise DMA 50
Loud Noise DMA 75
RIGHT EAR
Hearing Loss
1 2 3 4 5 6 7 8
30 27 24 21 18 15 12 9 6 3 0 −3

Recently Guttman[4] has given undoubted examples of paracusis. These are the first instances seen where accurate measurements have proven the condition. The following charts will further confirm these occasional discoveries. Use was made of the phonograph audiometer as a source of speech sounds of dependable intensity. These were submitted to the patients to hear and to interpret. The words spoken dropped down in intensity in successive steps of three sensation units. The various types of interfering noise was simultaneously presented. The strengths and types of noises are noticed on the charts.

Conclusions: Cases of true paracusis will occasionally be found. In most instances where it exists there will be seen a small increase in acuity only when small noises are presented. These facts are true and contrary to the principle that low noises invariably dampen higher (speech) sounds.

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1805 Chestnut Street.

AGRANULOCYTIC ANGINA: REPORT OF THREE CASES. A DISCUSSION; WITH REPORT OF THREE CASES.

Dr. Harold Hays and Dr. Henry E. Montross,
New York.

In reading through some of the recent literature on agranulocytic angina, incidental to the report of our cases, one is impressed by the increasing interest shown in this disease, and by the variety of theories presented as to its etiology and mode of infection. And in the midst of this wilderness of thought there reigns supreme the fearsome dragon of a mortality of well over 90 per cent. According to Jacobsen[1] out of 150 cases reported seven were pronounced recoveries. In addition, there are two reports of a second attack proving fatal.

Agranulocytic angina was so named and first reported by Schultz[2] in 1922. He noted the distinguishing feature of the marked leukopenia, which runs through all the cases, whatever the inciting cause, and combined with this blood picture, the necrotic throat lesions, naming the whole disease entity in a descriptive way. Schultz believed that the throat lesions were a necessary feature of the disease, but some investigators, Hutcheson[3], for instance, reports a case under the heading of agranulocytic angina, in which the clinical symptoms were chiefly abdominal and, although the throat in this case was inflamed, there were no anginoid ulcerations.

As has been mentioned, the peculiar feature of this disease is the marked reduction in the number of polymorphonuclear cells, as well as the lymphocytic cells. The white blood count may go as low as 200 or 300 cells per c.m. There is always a marked relative lymphocytosis, even up to 100 per cent. The etiology of the disease is still the source of a great deal of discussion. Is it bacterial? If so, what is the offending organism? From both throat and blood cultures, there have been isolated Vincent's spirochetes, fusiform bacilli, pseudodiphtheritic bacilli, bacillus pyocyaneus, bacillus coli, staphylococcus, streptococcus hemolyticus and viridans. Lovett[4] thinks the causative organism is the bacillus pyocyaneus. Skiles states that he was unable to isolate any organism. It is his belief that the cause of the disease is a specific infection, resulting in local necrosis, which, in turn, yields a specific toxin possessed of the power to act in a destructive way

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upon the bone marrow. Or else a primary infection of the bone marrow results in a damage to the reticuloendothelial system, with a decreased production of leukocytes. The low leukocytic count in turn brings about a lowering of body resistance and an increased susceptibility to intercurrent infection, either general or local, as in the throat. This theory falls in line with the throat manifestations seen following such disturbances of the bone marrow as observed in the leukemias. The theory of a primary attack upon the bone marrow, with a secondary and resultant infection of the throat accords with our own thought upon the subject. One of us (Hays) recently observed a case which began as a typical pneumonia, with a characteristically elevated white count, and which in the space of two days developed an inflamed throat. A blood count taken at this time showed a leukopenia of 400 cells. In this case the toxin of the pneumococcus was so overwhelming that the reticuloendothelial system of the individual, through an idiosyncrasitic susceptibility, was damaged, with a consequent depletion of the granulocytes. Talley and Griffith[5], in a report of six cases, show that the original destructive toxin may be produced from several causes. In one of their cases the disease started with an infected tooth, and both the socket and blood stream showed streptococcus hemolyticus. In another of their cases the patient, a woman age 50 years, suffered a laceration of the palm of her right hand. Signs and symptoms of gangrene developed in the arm. Bacillus welchi serum was given, but death ensued in six hours. There was, of course, the distinguishing feature of leukopenia. Another case, that of a young man who had had diphtheria six months before, with apparent recovery, developed a leukopenia of 840 white blood cells with 100 per cent lymphocytes. It is noteworthy that in this case there were no throat manifestations, a fact which apparently bears out the theory that the reticuloendothelial system is the original site of pathology, with the throat lesions only incidental phenomena. Another case reported in this group was one of arsenical poisoning and arsenical hepatitis. The throat culture and blood stream were negative. No original focus was found.

Jacobsen has stated logically that any toxin, if sufficiently overwhelming, will damage the bone marrow and the entire reticuloendothelial system to the extent that the white blood count will be greatly reduced. The reason that the granulocytes are more affected is that they are developed from reticulum in open sinusoids, where exposure to the circulation is greatest. Overwhelming doses of any toxic agent, such as benzol, arsphenamin, bacterial toxins, X-ray, will then cause a lowering of the white blood count. Mild doses of these same toxic agents are known to cause a rise in the white blood count. It is on

this basis that myelogenous leukemia is relieved by comparatively large doses of X-ray over the long bone, and it may as well be stated here that at least one curative treatment for agranulocytic angina has been found to be exposure to mild doses of the X-ray. There are on record, according to Jacobsen, 24 cases of arsphenamin poisoning, 11 of which showed stomatitis and sore throat, and all of which revealed a lowered white blood count.

The clinical picture of agranulocytic angina, with the exception, of course, of the marked and constant leukopenia, is somewhat variable. The disease generally attacks middle-aged women, although two cases in children have been reported. The onset is sudden, though it may be gradual. There is high fever of a continuous type. Chills and prostration occur. Jaundice is not infrequent. Death generally occurs in from a day to two weeks. Ulcerative manifestations in the throat, as well as in the esophagus, rectum and vagina, often occur after the disease is well established. This is a noteworthy point and helps to support our foregoing contentions. The throat lesions cause difficulty in swallowing. A gray necrotic exudate appears on the tonsils, gums and buccal surfaces of the cheeks. The exudate, putrid in odor, is tenacious, but does not bleed upon removal. The tonsils themselves may or may not be congested. The cervical glands may be enlarged. They remain discrete and freely movable, but may become matted and form a collar about the neck. There is no general adenopathy, although the spleen is sometimes enlarged. The red blood count and hemoglobin remain within normal limits. At autopsy the bone marrow shows no characteristic findings. Generally, the bone marrow does not contain granulocytes. It may be fatty or red. According to Piott[6] bacterial emboli are found in the kidneys and suprarenal glands, with no pathology in the liver, spleen and glands.

When a case of severe throat infection presents itself to the physician, diphtheria and the various blood dyscrasias should be thought of in the differential diagnosis[7]. The blood picture, of course, is of highest importance owing to the great amount of information to be gained thereby. The details of the blood pictures of agranulocytosis and of the leukemias are sufficiently familiar. In diphtheria, the throat culture, the membrane which bleeds upon removal in contradistinction to the membrane seen in the leukemias and in granulocytosis, the reaction to diphtheria antitoxin—all these help the differentiation. The leukemias will show a general adenopathy and spontaneous hemorrhages from various organs. Agranulocytic angina shows neither of these phenomena. The importance of reasoning through a differential diagnosis such as has been outlined is perhaps illustrated in the three cases we desire to record.

Case 1: On Oct. 5, 1930, one of us (Hays) was called in consultation by Dr. Berlinger to see a man, age 65 years, who had just been brought into the hospital, suffering from an undiagnosed throat condition. The patient had been expectorating blood and pus for a few days, had been running an intermittent temperature up to 104° and had great difficulty in swallowing. Another physician had made a tentative diagnosis of a peritonsillar abscess on the left side.

Examination showed a man who was extremely prostrated, with dryness of the skin. He was unconscious and breathing heavily through the mouth. There was an extremely foul odor to the breath, suggestive of necrosis. The temperature was 102. Teeth were carious.. There was thick, tenacious mucopus on the throat and a definite blackened, necrotic area of mucous membrane could be seen in the region of the left tonsil. There was evidence of recent hemorrhage behind the tonsil. The remaining mucosa of the throat was engorged and edematous.

The blood culture was negative. Wassermann test negative. The blood count, indicating the diagnosis, was as follows: R. B. C., 4,416,000; leukocytes, 1,400; hemoglobin, 85 per cent; color index, 0.9. Differential count: Polymorphonuclears, 2 per cent; neutrophiles, 2 per cent; myelocytes, 2 per cent; lymphocytes, 90 per cent; mononuclears, 6 per cent.

The patient died within 24 hours after examination; temperature, 105°.

Case 2: While waiting to see this woman, age 50 years, in consultation with Dr. Meltzer, she suddenly died. The foul odor to the breath was suggestive and examination showed a dried skin, necrosed mucous membrane in the throat. A smear of blood was examined and although no total count could be made, no polymorphonuclear leukocytes could be seen.

Case 3: This woman, also seen in consultation, was in an oxygen tent, therefore examination of the throat could not be made. A diagnoses of bronchopneumonia had been made. The blood count was 20,000 white blood cells, 80 per cent of polymorphonuclear cells. But the facies of the patient was typical of agranulocytic angina. Just before death another blood count was made, which showed 400 white blood cells and no polymorphonuclears.

Ralph L. Fisher[5] reports in the *Journal of the Michigan State Medical Society* for June, 1930, a case which he successfully treated with the blood of a patient who had recovered from agranulocytic angina after an ordinary blood transfusion, arsphenamin, sodium nucleinate, the injection of 25,000,000 dead typhoid germs had all failed. X-ray treatment of the long bones was not tried in this case.

The patient was a young woman, age 24 years, who, two weeks prior to the frank manifestation of the disease, had developed malaise and sore gums. A smear of the gums showed Vincent's organisms. Four-tenths gram of neosalvarsan were given intravenously, an injection which was followed the same afternoon by a chill, sore throat and vomiting. Physical examination showed flushed cheeks and a hot skin. The tonsils had been removed. The palate and pillars were swollen and the entire throat injected. There were ulcerations on the lingual tonsils. The gums were covered with a dirty grayish exudate, which appeared to be spreading to the pharynx and larynx. The cervical and submaxillary glands were enlarged. There was a cellulitis on the right side of the neck, which later developed into a cervical abscess. (Fisher thinks that this abscess influenced recovery. He does not state the reason, but probably means that the abscess, localized as it was, stimulated leukocytosis.) The past medical history showed a mild antritis. On admission, the polymorphonuclears were 6 per cent, lymphocytes, 94 per cent, and the white blood count, 1,200. After a transfusion of ordinary blood the white blood count went to 600, with no polymorphonuclears. The typhoid germs and sodium nucleinate were then tried, with only the very slightest improvement. A donor was then found, who had had the disease and had recovered and was of the same type. Such a providential combination is, of course, something of a rarity. Five hundred c.c. of this blood was given, with immediate improvement. The white blood count began to climb. The diffuse inflammation in the throat began to localize and to improve. In three days the count was 7,800, with 21 per cent of polymorphonuclear cells. Recovery ensued. Whether this recovery is permanent remains to be seen.

Agranulocytic angina presents the problem of a doubtful and rather obscure etiology, bacteriology and pathology and consequently a problematical course of treatment. Fortunately, the disease is comparatively rare, else it would indeed be a scourge.

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64 East 58th Street.

THE RELATION OF THE EPITHELIUM TO THE MUCOSA IN PACHYDERMIA LARYNGIS (WAX MODEL).*†

DR. LOUISE H. MEEKER, New York.

Pachydermia laryngis is of considerable historical importance and the descriptions by Virchow[1] are famous. This is partly because they relate to the Emperor Frederick, who died of carcinoma of the larynx. In this instance the carcinoma was engrafted upon a preceding pachydermia in the opinion of many laryngologists, although this is doubted by many others. Delafield and Prudden[2] state, "Carcinoma has been seen to develop on such a lesion." Frankel[3] recognized the condition clinically and thought he saw carcinoma develop from pachydermia laryngis. His studies of two cases are well known classic discussions on malignant metamorphosis. Ewing[4], however, says this metamorphosis from pachydermia laryngis has not been fully proved.

Pachydermia laryngis is, however, a disease that is often considered by the clinician to be a precursor of malignancy. Virchow described a diffuse and nodular form and his descriptions are still followed. We have made the present study from small bits of biopsy material reaching the laboratory, labeled "tissue from larynx." The largest pieces received are usually a few millimetres in diameter. We are aware that the report of a borderline activity between a benign and malignant process is very unsatisfactory to the clinician. It was the practical necessity of making a definite diagnosis from these small bits that has instigated this study. The puzzling pictures presented by such tissue forced us to work backward to the normal epithelial lining of the larynx in order to become familiar with its common variations.

Sections from the larynx at various ages have been the basis of the study. Vocal cords and their attachments have been dissected from individuals, age, respectively, 2 and 4 months and 2, 4, 11, 36 and 80 years, and coming to autopsy with no history of laryngitis. This material was cut in horizontal and vertical transverse and sagittal sections. The arrangement of the epithelium and mucous glands

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especially about the vocal process of the arytenoid and the elongation of the gland ducts with the ingrowing squamous epithelium seemed distinctive of this area, in particular the area including the fold of mucous membrane adjacent to the vocal process. The notable points seen at all ages were the great activity of the squamous epithelium,

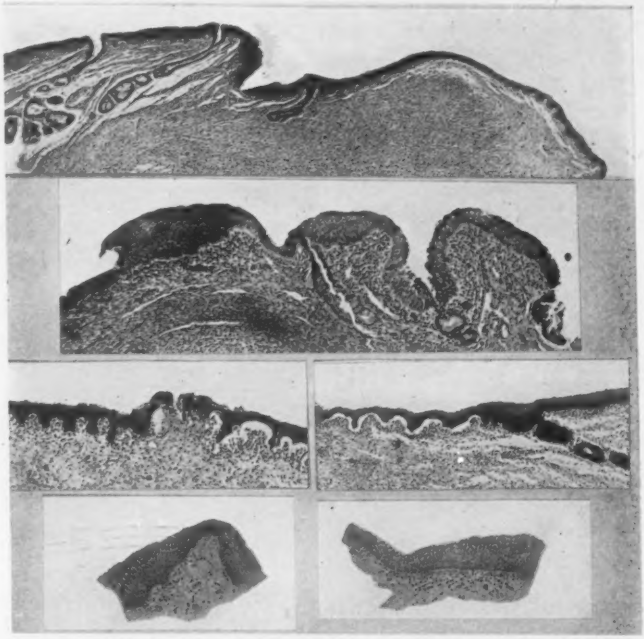

Fig. 1 (a). M., age 2 years. Postoperative. Vertical transverse section. Right, vocal process. Left, mucous glands above and anterior to vocal process. Note ampulliform ducts lined by squamous epithelium (normal).
(b). F., age 2 months (congenital lues). Horizontal section. Right, ampulliform openings of gland ducts. Note thickened epithelium over vocal process, left. There are 10 mitotic figures in epithelium (chronic inflammation).
(c). F., age 36 years (post-thyroidectomy). Horizontal section. Subglottic area, region of vocal process. Note squamous epithelium in gland ducts (chronic inflammation).
(d). Squamous epithelium over edge of true and false cords (after Heymann). The transition from squamous to columnar epithelium is distinctive for each cord.

the rapid filling in of the wide ampulliform surface openings of the ducts and the fusion of the epithelium to form solid masses. Within the deeper gland ducts we also found papillary thickenings of the epithelium were very common, as well as a tendency to metaplasia.

The next step was the comparison of these pictures of common variations to frankly pathological changes in order to ascertain with

some accuracy if possible when a diagnosis of malignancy was justified. The accredited signs of malignancy were checked off one by one in a selected example of pachydermia laryngis that we had considered on the borderline between a benign and a malignant process. The tissue in this particular case was both nodular and diffuse in type and removed from the vocal cords of a man, age 39 years. There was found greater activity of the epithelium than was seen in the normal mucosa. We found also larger and more numerous papillae. The squamous epithelium growing into the *ampullae* of the

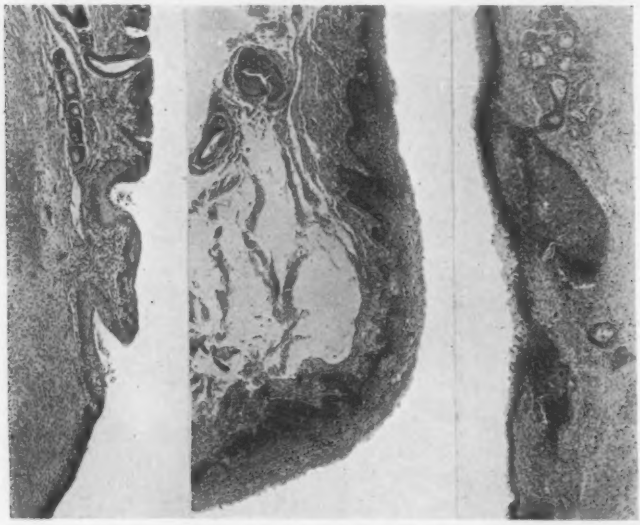

Fig. 2. [(b) and (c) are magnified more than (a)].
(a). M., age 4 years (acute purulent meningitis). Horizontal section region of vocal process. Note wide ampullae of gland ducts. Four mitotic figures in epithelium.
(b). M, age 80 years (accidental death). Vertical sagittal section through posterior commissure near vocal process. The thickened epithelium and wide papillae are prominent. No mitotic figures.
(c). F., age 36 years (post-thyroidectomy). Section in plane of section (a). Note wide gland duct ampullae filled with squamous epithelium. Seven mitotic figures.

gland ducts and the increase in numbers of *layers* of epithelium was noticeable but *atypical* forms of cells were scarce. We found *metaplasia* and *fusion* in areas showing very little proliferative activity. The filling in of the ampullae of the gland ducts and fusion *en masse* to form large *deeply-placed* islands of the epithelium has been described by Alexander[5] in his monograph on benign tumors of the larynx. The work done by Alexander was under the direction of

Frankel. In the deeper gland ducts we found changes all the way from papillary tufts of epithelium to metaplasia. The metaplasia affected a few cells and showed as well metaplasia *en masse*. We also found increase in the number of layers and fusion to form deeply-placed islands. In these deep islands the proliferative activity was less than near the surface and the metaplasia was seen to follow the mode of transition from columnar to squamous epithelium that is seen normally on the surface (Heymann[6]). The activity of the

Fig. 3. M., age 39 years. Section of small nodule (2.5 x 2 m.m.) chosen for wax model. Note the irregular, wide papillae. Twenty-one mitotic figures in the epithelium. Stroma predominates and shows diffuse infiltration by lymphocytes and plasma cells.

surface epithelium and broad papillae, together with the deeply-placed islands, indicated the third step in our study. We decided to make a wax reconstruction of superimposed sections of tissue in order to follow the epithelium in its invasion of the supporting stroma.

A very small nodule, but a few millimetres in diameter, showing in microscopic sections many irregular papillae and numerous mitotic figures, was chosen for reproduction in wax. Fifty sections,

10 microns thick, cut in series, were magnified 100 times by the Edinger apparatus, thus making the wax replica 100 times as large as the original nodule. We devised a plan to check up the proliferative activity of the epithelium covering the entire nodule. The numerous mitotic figures were marked wherever they occurred in a section by placing an opaque bead for each in the wax duplicate. The sections showed an average of 30 mitotic figures in each, with

Fig. 4. M., 39 years. High power. Extensions of the squamous epithelium on the surface fill the distended ampullae of the gland ducts. (a) The lumen is lined by columnar epithelium. Two mitotic figures in the narrow neck of the duct. (b) The lumen is lined partly by columnar and partly by squamous epithelium. Twelve mitotic figures in the narrow portion of duct near surface.

a total of 1600 for the nodule, which represented a sector measuring 2½ m.m. in diameter and 0.5 m.m. in thickness. The uppermost section showed 40 mitotic figures. We depended upon this method of marking the mitotic cells to discover whether there were any *isolated foci* of proliferative activity. Wax models of carcinoma of the breast have been made by Pedersen[7] and Hauser[8] to discover

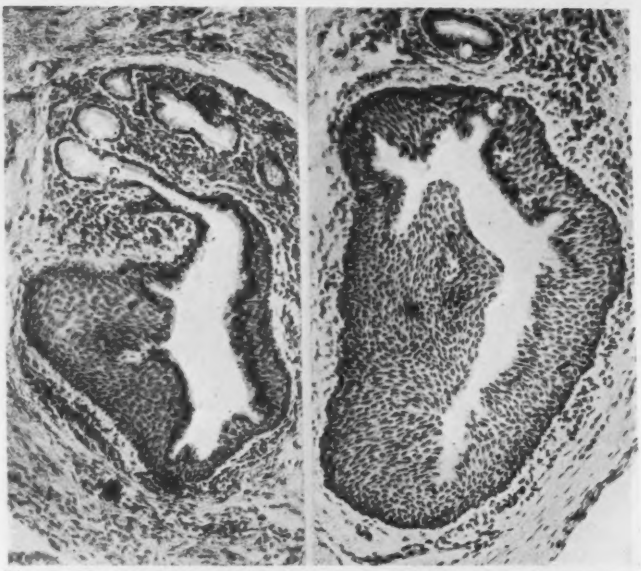

Fig. 5. M., age 39 years. High power. Sections show changes in the gland ducts, 3 m.m. beneath the surface. The two types of epithelium are seen, squamous and columnar. No mitotic figures.

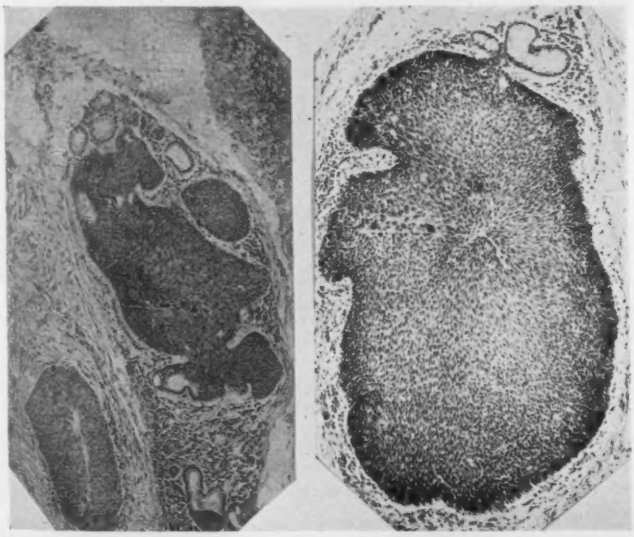

Fig. 6. (a). Same as Fig. 5. Fusion of epithelial layers to form solid islands. Two mitotic figures.
(b). Higher power than (a). Three mitotic figures.

whether carcinoma develops from a single focus or from multiple foci. They came to directly opposite conclusions. Our completed model was photographed and X-ray pictures were also made. The radiograph showed the mitotic figures were evenly distributed at all points and in all layers; that is to say, there were no foci of activity.

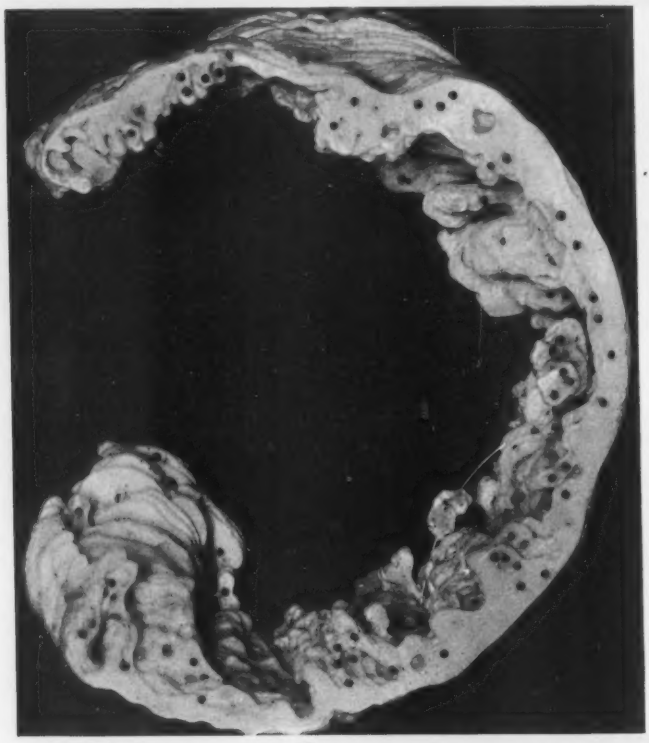

Fig. 7. Wax model of epithelial layer of sector of mucosa, 2.5 x 2 x 0.5 m.m. (X100). The black dots are opaque beads marking each mitotic figure. Forty mitotic figures in upper layer.

SUMMARY.

We have compared the pathological epithelial hyperplasia seen in a case of pachydermia laryngis with practically normal mucous membrane from the vocal cords and posterior commissure. The case studied was at first considered on the borderline between pachydermia laryngis and carcinoma.

The microscopic slides and the wax model studied have somewhat lessened the seriousness of the first diagnosis.

Radium treatment was instituted as a prophylactic measure after the first report. The second biopsy material was similar to the first. There has been no recurrence and it is now two years since the first biopsy tissue was removed. (We are indebted to Dr. Perrault for the privilege of studying this case.)

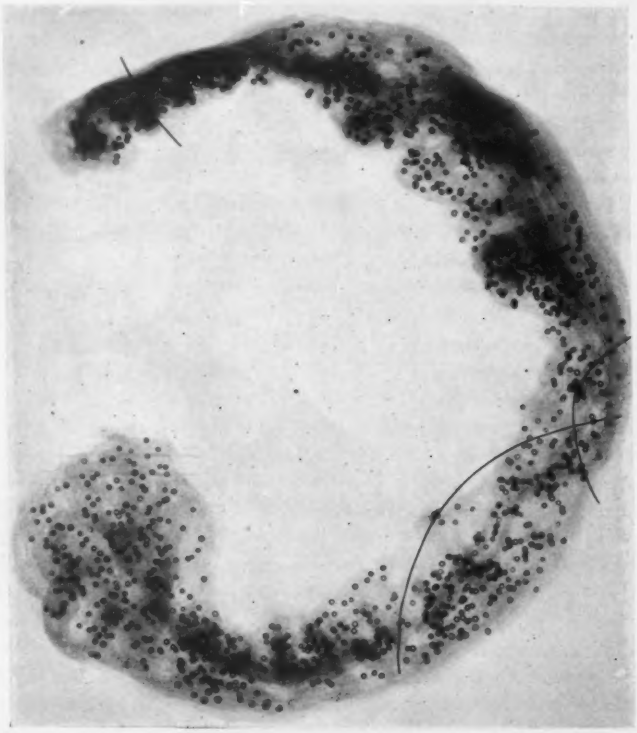

Fig. 8. X-ray photo of wax model. The mitotic figures are evenly distributed in the epithelium. There is a total of 1600 mitotic figures.

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303 East 20th Street.

ACUTE FRONTAL SINUSITIS, COMPLICATED BY OSTEOMYELITIS OF THE FRONTAL BONE AND EXTRADURAL ABSCESS. RECOVERY.*

Dr. Karl M. Houser, Philadelphia.

Fortunately, most cases of acute inflammation of the frontal sinus subside with the employment of conservative local nasal treatment. Sometimes, however, nasal treatment does not give relief, conservative surgical measures fail and actual osteomyelitis of the frontal bone occurs. When this does happen, the prognosis is always extremely grave.

The case to be described is that of a 17-year-old university student, who was admitted to the university hospital early in March, 1929. About a week before his admission he had had a slight cold, from which he had apparently recovered. Several days later he began to have frontal pain, which continued to become more and more severe. The pain was accompanied by general malaise. Some nausea and several attacks of vomiting occurred the day before admission.

Upon admission he was an obviously sick boy. Prostration was marked, severe pain was present, his temperature was 103.4° and the leukocytes count 21,900, 84 per cent of which were of the polymorphonuclear variety. There was tenderness over both frontal sinuses, more marked on the right side. Slight edema could be detected by palpation a bit to the right of the midline and about 3 c.m. above the supraorbital ridge. Both frontal sinuses were dark to transmitted light. The maxillary sinuses were negative. Intranasal examination showed a rather slight amount of swelling and congestion of the middle turbinates and nasal mucous membrane. Streams of pus were present on both sides from the posterior ends of the middle meatuses and also in the sphenoethmoidal recess. All general examinations were negative for evidence of disease of the chest, abdomen, etc. Blood cultures, too, were sterile.

In spite of the usual general treatment and intranasal medication, the condition of the boy became steadily worse. The swelling high over the right frontal sinus became more pronounced, inflammation of the right eye developed, which was sufficiently marked to cause

*From the Department of Otolaryngology of the University of Pennsylvania.

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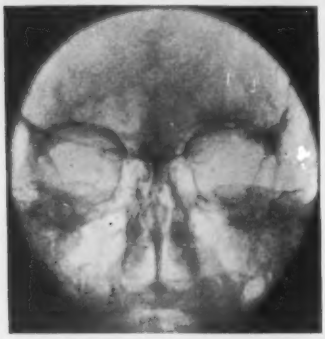

Fig. 1. Clouding of the left frontal sinus, haziness of the right. Slight clouding of left antrum. Note the small pocket which extends from the left frontal sinus across the midline. In this region the pus had broken through to form the right subperiosteal abscess.

Fig. 2. Exposure made two months after onset of disease. Note extensive osteomyelitis of frontal bones more marked on the right and large craniectomy opening.

Fig. 3. Eight months after onset of disease. Improvement of involved areas. New bone formation without great thickening.

some fixation of the bulb and marked chemosis of the conjunctiva. No fundus changes were present at this time and the disc margins were well defined. The X-ray reported clouding of the left frontal sinus and haziness of the right; clouding of the left antrum; clouding of the right ethmoids and hazy sphenoids.

Although the Xray reported the conditions of the left frontal sinus to be more definite than the right, the ocular symptoms were more pronounced on the right and tenderness and swelling were present only on this side. On account of this fact the anterior third of the right middle turbinate was removed one week after admission. At the same time several ethmoid cells in the region of the nasofrontal duct were opened and the sinus probed. Very little pus was discovered. No improvement followed this maneuver. On the following day the leukocytes had risen to 28,000, swelling of the forehead had increased, and the chemosis of the conjunctiva of the right eye was more pronounced. Under general anesthesia a small button of bone was removed from the lower inner portion of the anterior wall of each frontal sinus, the right being opened first. Both sinuses were filled with thick pus, which was removed by suction. The mucous membrane was swollen but not polypoid, and palpation of the interior of the right sinus revealed no evidence of bony involvement. On the left in the most superior portion of the sinus space, the probe encountered bare bone. This area corresponded with a small frontal sinus lobule seen in the X-ray films, which extended from the left frontal sinus slightly across the midline. At the same time, a large subperiosteal abscess was found and evacuated a little to the right of the midline and about 3 c.m. above the supraorbital ridge.

Following this operation there was decided improvement in the external condition of the eye and the patient was more comfortable. Fluctuant areas, however, developed high in the right frontal and right frontotemporal regions. He was seen in consultation by Dr. Geo. Fetterolf and Dr. Francis Clark Grant, who, under local anesthesia, made three incisions; one about 6.5 c.m. above the right supraorbital ridge near the midline, another on a line between this incision and the tip of the ear and about 5 c.m. behind the former, and a third about 2.5 c.m. above the right ear. An abundance of pus was obtained from all three areas and at each place the periosteum was found to be elevated. The three wounds were connected by subgaleal tunneling and drained by rubber tubes.

In spite of this drainage the boy's condition did not improve and signs of increased intracranial pressure became definite. Vomiting, headache, slow respiration and pulse, along with bilateral choking of the optic discs, forced this conclusion.

On account of these findings it was decided that the posterior wall of one or both frontal sinuses should be removed, to determine the presence or absence of extradural abscess.

Dr. Grant, under local anesthesia, then removed the anterior wall of both frontal sinuses. On the right side the frontal bone showed definite evidence of extensive and marked osteomyelitis. This condition was present but less advanced on the left. Considerable pus and necrotic tissue was present in the sinus cavities. The posterior wall of the right frontal sinus was then removed and about 1 c.c. of pus immediately welled into the wound. This opening was widened and it was found that the dura over the right frontal lobe was covered with granulation tissue and occasional pockets of pus were discovered. The bone was soft and obviously diseased. In all, an area about 12 c.m. long and 6 c.m. wide was removed from the right frontal region. The dura was then exposed behind the left frontal sinus by a continuation of the opening across the midline. In this region there was no evidence of disease. The wound was packed wide open and convalescence began at once. In a week optic disc choking had disappeared and headaches were markedly improved. On account of the wide open wound and the extensive bony involvement, hospitalization was of necessity long. He was discharged from the hospital on May 7, four months after admission. Since that time, two years ago, he has been under periodic observation. No evidence of brain abscess has developed, discharge has ceased, and his general condition was such during the summer that he was able to swim, ride horseback and play golf. In October, 1929, a small collection of pus occurred under the skin in the right frontal region above the external extremity of the supraorbital ridge. About one-half ounce of pus was evacuated from this region. Since then no further collections have occurred.

1826 Pine Street.

International Digest of Current Otolaryngology.

Editor:
Dr. Maxwell Fineberg, St. Louis.

Collaborators:
Prof. G. Bilancioni, Rome.
Mr. W. S. Daggett, London.
Priv. Doz. G. Kelemen, Budapest.
Dr. H. C. Rosenberger, Cleveland.

Clue and Cattell, in the Annals of Surgery for July, 1930, report the surgical treatment of 60 cases of thyroglossal cysts and sinuses, of which 41 were cysts, 18 were sinuses and one fistula.

The authors stress the great importance of radical removal as the only guarantee of nonrecurrence. In their experience, 25 patients had been operated previously, none of which operations had been radical. They recommend the procedure devised by Sistrunk and reported in 1920. Rosenberger.

Granger, of New Orleans, in the Nov. 1, 1930, issue of the *Jour. A. M. A.*, presents a short article on the Roentgen examination of paranasal sinuses and mastoids. He describes what is known as the Granger Position of the head for pictures of the nasal sinuses and mastoids. He compares his own position to the Law Position and explains the advantages of the former. He claims to be able to make a diagnosis of labyrinthitis because the superior semicircular canal is clearly visible. He was also able to make a preoperative diagnosis of tumor of the acoustic nerve in two cases because the outline and course of the internal auditory canal was clearly visible. In infants and children under 6 years of age, the Law Position is the only one that can be satisfactorily employed.

Langenback, in the Zeit. f. H., N. u. O., 28:112:1931, discusses labyrinthitis with special reference to lumbar puncture and the indications for operation. He reports 55 cases of labyrinthitis, of which 23 were admitted with an existing meningitis. Of this number five were saved by an immediate labyrinth operation. Twenty other cases developed a mild meningitis at the beginning of their treatment and

eight of this group ended fatally. As a result of his experience with this group of cases, the author comes to the conclusion that one must be very conservative, perhaps even more conservative than has been the present custom. At least two of his cases showed markedly bad results from the opening of the labyrinth; however, even these two cases survived. KELEMEN.

Pancoast, of Philadelphia, in the Nov. 1, 1930, issue of the *Jour. A. M. A.*, presents an article on the Roentgenology of the upper respiratory tract with special reference to the larynx and adjacent structures. He describes the technique of examining the neck, and in his conclusions states that practically all of the pathologic conditions presented by the larynx and neuromusclar disturbances show some recognizable phenomena or abnormal appearances, many of which are characteristic. The examination must be fluoroscopic for studying the moving parts and Roentgenographic for the purpose of recording the finer details. The study of phonation and swallowing is essential in all cases. The article contains eight illustrations which very clearly show the points made by the author.

Chevalier Lawrence Jackson, of Philadelphia, in the Nov. 1, 1930, issue of the *Jour. A. M. A.*, presents an article which follows that of Pancoast and is correlated with Roentgenographic observations in the diagnosis of laryngeal disease. The article presents numerous cases in which X-ray study was used in making the diagnosis, and Jackson concludes his article with the statement that the Roentgenologist can now detect inflammatory and neuroplastic processes in their incipiency when they are causing only the mildest symptoms.

Segar and Stoeffler, of Indianapolis, in the Feb. 28, 1931 issue of the *Jour. A. M. A.*, present an article on mastoiditis and lateral sinus thrombosis in an infant. Their case was in an 8-weeks-old infant with a history of sudden onset of fever and restlessness. Physical examination showed little of interest, but a Röentgenogram of the chest showed signs of a pneumonitis. Both eardrums were normal and there was no tenderness behind the ears. The infant, however, had shown a tendency to incline the head toward the right shoulder, but no appreciable resistance was encountered on turning the head in various positions. Lumbar puncture showed a turbid fluid under

pressure, with 9,200 cells and 90 per cent polymorphs. The authors believed they were dealing with a meningitis and treated the patient by spinal drainage and introduction of serum. The patient did not improve; soon generalized rigidity and beginning protrusion of the eyeball appeared, together with a diminishing amount of fluid from the spinal subarachnoid region. A block at the base of the brain was considered probable and the right ventricle was tapped; clear fluid was obtained. Spinal fluid culture now recorded a Gram positive staphylococcus; probably a contamination. The baby now was moribund and was having convulsions; she died six days after admission to the hospital, and 10 days after onset of illness. Autopsy revealed pus around the base of the brain, but no hemorrhage or exudate on the surface of the brain. The right lateral sinus was completely occluded and filled with a friable, pink clot adherent to the walls of the sinus. As the incision around the sinus was continued around the ridge of the sphenoid to the sella turcica there exuded a profuse, creamy, yellow pus. Pressure on this region caused pus to exude from along the area of the optic tract as it entered the orbit, and pressure on the eye caused about 10 c.c. of thick pus to exude from the tract, the eye receding to its normal position. The right mastoid cells were filled with a creamy, straw-colored pus; the drum was intact. Cultures taken from the right mastoid, the right lateral sinus and the brain showed a staphylococcus similar to the organism grown from the spinal fluid. The authors conclude by stating that there were no clues to mastoid involvement and they add that it seems doubtful whether a mastoid operation and ligation of the internal jugular vein on the day of admission to the hospital would have changed the outcome.

THE NEW YORK ACADEMY OF MEDICINE.

SECTION OF LARYNGOLOGY AND RHINOLOGY.

Meeting of Jan. 28, 1931.

Venous Aneurysm of Face. Dr. A. J. Conty.

Osteoma Involving Orbit, Ethmoids, Frontal and Sphenoidal; Operation. Dr. Robert E. Buckley.

DISCUSSION.

DR. SOLOMON FINEMAN: I have a few slides to show osteamatous growth in the skull. The first slide illustrates the ordinary osteoma, usually symptomless. These may occur in the frontals, antra, and occasionally in the sphenoids. They are hard, and can be removed without much difficulty.

The second type belong to the group of mixed tumors, made up of fibromatous and osteamatous tissues. These originate in the sinuses, may attain considerable size, and may produce pressure on the orbit. These growths assûme considerable size and hang in the nasal passages or sinuses in grape-like formations. They may be quiescent for many years, and then begin to grow and produce symptoms. They may force their way into the frontal sinuses, the orbits; fill the nasal cavity and invade the antra. They are to be differentiated from giant-cell tumors. Geschickter and Copeland, of Johns Hopkins, reported recently on a study of giant-cell tumors, 14 cases in the lower, six in the region of the antra, and two in the region of the temporal fossa. Their theory is that these tumors originate from ethmoid bone or the greater wing of the sphenoid, which are cartilaginous in origin. The Roentgenologic picture of the two may be similar at times, but it is important to keep these two possibilities in mind, since they require different forms of treatment.

The third type, or malignant type, is rare and difficult to diagnose Roentgenologically. Very little is to be seen on the X-ray plate. This case shows slight but definite changes along the edge of the antral walls, which have a moth-eaten appearance. This is seen best in the stereoscopic films. The opposite healthy antrum shows in contrast distinct, clear-cut lines. The malignant type of disease of the antrum may pass unnoticed because the commonly seen pathologic changes in the antrum give a similar picture except for the moth-eaten appearance along the edge of the bone. In this particular case, a lipiodol injection into the small remaining antral cavity revealed a fistulous tract to the bone and soft tissues of the alveolus.

Tertiary Syphilis of the Larynx. Dr. Leopold Glushak.

(To appear in a subsequent issue of THE LARYNGOSCOPE.*)*

DISCUSSION.

DR. M. C. MYERSON: The presentation of the case of lues of the larynx might have been more instructive to us, and I do not say this in the spirit of criticism, but from the standpoint of making these presentations worth while. The doctor mentioned the fact that the patient had no temperature or pain. He also mentioned the possibility of there being a carcinoma. If this were so, there should have been pain. The same picture which was depicted, as he presented the case and made his drawings, could have fitted in very nicely with a streptococcic infection of the larynx, and if the patient had had a temperature, with that redness and edema, he could have very well that condition. The presentation was in this way incomplete. I would like to know if the patient had a painless larynx and no temperature.

DR. L. GLUSHAK: I started out to say that this patient came in, an apparently healthy individual. We would have mentioned it if he had had a high temperature or been sick. He had no complaint except severe hoarseness. He had no pain, and no temperature.

The Relation of the Epithelium to the Mucosa in Pachydermia Laryngis.
Dr. Louise H. Meeker.

(Appears in full in this issue of THE LARYNGOSCOPE.*)*

DISCUSSION.

DR. A. A. EGGSTON: I am grateful to Dr. Meeker for presenting this subject so beautifully demonstrated, realizing that it has incurred a great deal of patience and detail work. Wax modeling is a graphic way to demonstrate histological and histopathological structures. The relationship of the title of the paper to the slides, I cannot thoroughly appreciate. From a pathological point of view, the term "pachydermia laryngis" is a misnomer. The process of development in most of these instances is a hyperplasia of the squamous epithelium with excessive keratinization and therefore hyperkeratosis would be a more expressive terminology. It is true, the word pachydermia laryngis has quite an historical background, which probably explains its survival in the literature, but few clinicians or pathologists continue its usage.

The section from which the model is made impresses me as more of a papillomatous polyp lesion, because of the nature of the epithelial changes and also because of the marked and diffuse inflammatory reaction, which is not confined to the area adjacent to the epithelium, as you would expect to find in a pachydermia or hyperkeratosis. Many tissues are submitted to the laboratory at the Manhattan Eye, Ear and Throat Hospital, offering a great variety for study. A great many laryngeal biopsies yield very small bits of tissue for accurate diagnosis. However, if there is a close co-operation of the bronchoscopic clinic and the laboraotry more tissue can be obtained. Repeated biopsies are very useful, as in many instances a diagnosis of hyperkeratosis papilloma has been made, and in a year or so another biopsy would reveal a similar condition, while a subsequent biopsy in two, three or four years would show that the tissue has shown definite epitheliomatous degeneration.

These studies lead me to consider hyperkeratosis of the larynx as of a precancerous nature. These cases should be followed over a period of several years, and frequently there will be a recurrence, or even the diagnosis of actual malignancy can be made. This is true of both the verrucous and the diffuse type of hyperkeratosis.

The etiology of hyperkeratosis has some relationship to irritation from alcohol, smoking, inhaling fumes from certain industrial works. Another factor appears to be the chronic irritation, due to the postnasal dripping in chronic sinusitis. There also appears to be a relationship with badly infected teeth and pyorrhea, with lesions of the larynx.

DR. C. J. IMPERATORI: I do not feel that we can let this go by, simply addressing our remarks to the pathological or histological pictures shown. It almost seems to me as though Dr. Meeker has mistaken the name of what she showed here. I know there is more or less a conception in some of the later textbooks that pachydermia laryngis is an entity that should be considered with those near-neoplasms or in the neoplastic group. I speak, not from a pathological standpoint, but purely from a clinical standpoint.

My conception of pachydermia laryngis is a piling up of tissues, keratotic in type, that may be peeled off, and usually and most always is in the posterior commissure. I have always felt it to be an early stage of what may be termed laryngitis sicca. I may be wrong about that. It does not seem to me that I can recall a pachydermia laryngis becoming malignant. I rather think that eventually this idea will disappear.

DR. LOUISE H. MEEKER: I wish to thank Dr. Eggston and Dr. Imperatori both for covering something of the dilemma. The term "pachydermia laryngis" is still used by pathologists. Ewing uses for illustration of pachydermia laryngis a section similar to the nodule I showed, and I chose it for that reason. The nodule modeled in wax is 1½ x 2 m.m. in diameter. Frankel disregards it in the borderline areas. It is not so much the keratosis as the behavior of the epithelium in its down growth. I chose the warty type of pachydermia because of the enormous work entailed in making the wax model.

Symposium: Present Status of Sinusitis in Eye Disorders.
Abstract of Recent Literature. Dr. Chas. J. Imperatori.
Ophthalmological Aspect. Dr. Lewis W. Crigler.
Rhinological Aspect. Dr. Duncan Macpherson.

(Appears in full in this issue of THE LARYNGOSCOPE.*)*

DISCUSSION.

DR. A. A. EGGSTON: It was the encouragement of Dr. Lewis A. Coffin which induced me to attempt the study of the pathology of chronic sinusitis and has led to a vascular explanation of the development of the lesions. At first it was thought that the chief lesions were of a phlebitic nature, but further studies of many varieties of ethmoid and sphenoid and antral tissues have shown that not only the veins, but the arterioles and lymphatics play a part in the pathological processes. The results of these investigations have been published in the Archives of Otolaryngology, Nov., 1930, Vol. 12, pp. 561-583. Reference to this article will furnish the reader with a full description of the pathology and lantern slides.

The type of pathology which was found, usually associated with ophthalmic disease, has been reviewed by Dr. Crigler in his discussion of this subject which has preceded my remarks.

The proper treatment of sinusitis must depend upon securing the appropriate vascular reactions; in one case, increased venous and lymphatic drainage, while in another case, increased arterial supply is desired. The appropriate treatment, therefore, depends upon the type of pathology present in each individual case.

DR. L. W. CRIGLER: Replying to Dr. Macpherson's remarks relative to choked disc, I will say that I do not think that it ever occurs as a result of sinusitis. True choked disc only occurs as a result of increased intracranial pressure. The swelling of the nerve head which occurs in sinusitis is due to an optic neuritis. Ophthalmoscopically, the two conditions resemble each other very closely at times, but in the early stages of choked disc there may be no appreciable impairment of central vision and unless from pituitary tumor, early field defects may be absent; whereas, in optic neuritis, due to any cause, and especially sinusitis, early impairment of vision, central scotoma and, later, peripheral field defects, are common. Both conditions may produce an enlargement of the blind spot.

THE NEW YORK ACADEMY OF MEDICINE.

SECTION OF LARYNGOLOGY AND RHINOLOGY.

Meeting of March 25, 1931.

Presentation of Instruments: 1. New Lighting System for Nasopharyngoscope. 2. Modified Antrascope. 3. Eustacheascope. 4. Self-Angulating Snare. Dr. Louis R. Pitman.

Cotton Applicators. Dr. Harry Neivert.

The presentation of such prosaic instruments as cotton applicators scarcely deserves a place on so important a program as we have here tonight; however, I believe that there are several features about these applicators that may be of interest to some of you.

The first applicator is primarily designed to facilitate the making and proper use of cotton tampons in the nose or ear. It is made of *square* wire and it is best not to bend it, for that would defeat one of the prime reasons for its use, *i. e.*, easy removability of the tampon. A piece of cotton about 2½ inches square is laid across the tips of the fingers of the left hand. The applicator, in the right hand, is laid across the square, slightly beyond the true diagonal line, and the cotton is then firmly wound about it with the thumbs and index fingers so as to make a tampon of fairly even diameter except at the very tip, where it is slightly tapered to facilitate introduction into the nose. Before dipping into the solution of choice, the tampon is slipped off the applicator, about two-thirds of its length. This procedure prevents the moistened tip of the tampon from sticking to the applicator when the latter is withdrawn. In children the tampon is removed completely from the applicator and placed into position with the fingers, entirely avoiding the use of any instruments.

The second applicator I desire to present is made in various sizes of round, soft-drawn copper wire, the shank and handle being of one continuous piece with a loop at the end of the latter. The loop is slightly bent to one side to act as an indicator when the applicator is placed in the nose, with its tip bent in the same plane as the loop. This is especially useful, for instance, where application is to be made to the Eustachian orifice. The shorter size is used under the lower and middle turbinates, or to block the anterior ethmoidal nerve. The medium-sized applicators are very useful for treating the region of the sphenopalatine ganglion. Cotton is firmly held on the squared tip, yet can be easily removed. Being very flexible, these applicators can be bent almost indefinitely without breaking.

I also wish to present a graduated, ball-tipped sinus probe patterned after Skillern's probe. Made of soft copper, it is much more flexible, more durable and very much cheaper than the silver probes.

These various applicators have been of such great value to me that I pass them on, feeling that they may be of equal benefit to others.

An Improved Pomeroy Syringe. Dr. Francis W. White.

(To appear in a subsequent issue of THE LARYNGOSCOPE.*)*

Carcinoma of the Larynx. Dr. Louis Hubert.

Laryngofissure 18 months ago. S. L., a man, age 62 years, born in Russia, a tailor by occupation, was referred to me by Dr. Julius J. Guttman, of Brooklyn, on Sept. 3, 1929, complaining of persistent hoarseness for the last six months. He had lost some weight, about 10 pounds, and one week before first seen he had a bloody expectoration. There was no cough, no respiratory obstruction, no pain or difficulty on swallowing.

Examination showed both vocal cords freely movable. On the right vocal cord there was a whitish-gray, sessile, single and warty looking growth occupying the upper and anterior one-third of the cord. No other signs were

present. The Wassermann and Kahn reactions were negative. A diagnosis of intrinsic carcinoma of the larynx was made and the patient sent to the Manhattan Eye, Ear and Throat Hospital. We were so certain of the diagnosis that no biopsy was done. Inasmuch as the vocal cords were freely movable and the growth was confined to the anterior one-third of the cord, it was decided to do a laryngofissure, which was performed on Sept. 24, 1929. A tracheotomy was done under local anesthesia and for the remainder of the operation ether was administered through the tracheotomy opening. The object of the operation was not just a splitting of the larynx and the removal of the vocal cord with the growth, but practically a partial laryngectomy as advocated by St. Clair Thomson. With an elevator the internal perichondrium was raised from the thyroid cartilage on the right side, starting from its anterior, divided edge. The separation was carried upward to the upper border, backward to the arytenoid cartilage and downward to the subglottic area below the lower edge of the thyroid cartilage. The separated mass was then removed completely in one piece, showing the whole length of the true and false cords, the entire ventricle of Morgagni, the arytenoid cartilage and the subglottic area. With the exception of the thyroid cartilage the entire right half of the larynx was removed. The wound was not sutured, in order to allow free drainage from the interior of the larynx and to prevent cartilage necrosis. The recovery was uneventful.

Laboratory report: Sections of the tumor mass show marked papillary hyperplasia of the mucosa with extensive hyalinization and pearl formation. There is marked infiltration of the stroma, with active mitosis. The adjacent stroma shows marked mononuclear reaction. Diagnosis: Squamous-celled epithelioma.

During the first six months following the operation on three different occasions tissue was removed from the operated area and diagnosed by the pathologist as granulated tissue, with no signs of malignancy. During the last year no tissue was removed as the larynx looks perfectly clear. The patient has regained his usual weight, feels well and has a fair voice.

Report of Two Cases of Sarcoma of Larynx. Dr. J. G. Strickler.

Case 1: On Nov. 20, 1930, T. C., white, male, age 75 years, presented himself for treatment at the clinic of Dr. White. From there he was referred to the Bronchoscopic Clinic.

He complained of difficulty in breathing for some time, occasional cough, slight dysphagia, choking sensation when eating; for past two years occasional regurgitation of liquid and solid food shortly after eating.

Indirect examination reveals the following: The posterior pillars are adherent to the posterior pharyngeal wall. The epiglottis gives the appearance of having been cleanly amputated slightly more on the right than on the left. The rim is almost flush with the base of the tongue. The valeculae and lateral glossoepiglottidean spaces are practically absent. A fine web-like band crosses the interarytenoid space and a larger one passes from the right to the left arytenoid at a higher level. Two rather thick web-like bands extend from the arytenoids posterolaterally on each side. They are slightly over an inch in length in the vertical plane of the pyriform sinus, and separate the pyriform sinus from the hypopharynx on each side in such a way as to make two symmetrical, cone-shaped receptacles. These will be seen on the slide to be filled with barium.

Direct examination substantiated the indirect findings, and located a diverticulum essentially in the location and of a configuration mentioned under X-ray findings. By this method a section of tissue removed from the web and sent to the laboratory for examination revealed nothing unusual.

The X-ray reported the following: Fluoroscopy shows barium to collect in diverticulum in esophagus at level of sixth cervical vertebra. The sac fills to about the size of an egg and then spills over and leaves the sac about as large as half a walnut.

The Wassermann and Kahn tests were negative. Examination of the chest and X-ray showed no tuberculosis. The patient refused to have a provocative or spinal fluid Wassermann.

Mosher reports that postcricoid bands, due to caustics or ulceration, are quite common. Many cases treated for globus hystericus are really postcricoid webs. Congenital webs in this region are very rare. Imhofer, in 1912, reported an authentic case. According to Mosher (Jackson-Coates, p. 1025) no case of congenital diverticulum of the esophagus has ever been reported. He says that in the examination of 65 babies dead at birth, he never found a diverticulum of the esophagus. Chevalier Jackson, on the other hand, includes congenital diverticulum as one of three types. In his book he says: Cases of congenital diverticulum have come to the clinic. The wall included the muscular layers, which is not usually the case in acquired diverticulum.

Second presentation, following 10 radium treatments: This is the second presentation of this case. He was originally brought before this Section by Dr. Loré about one year ago. About 22 months ago, H. R., male, white, married, age 39 years, presented himself for treatment. He complained of hoarseness for four to five years; no cough; no dysphagia. Examination revealed a large polyp of the left cord. This was removed by the direct method and a specimen sent to the laboratory, with the following result:

Specimen consists of three nodular, rather firm masses of tissue. M. section shows an histological surface of squamous mucosa. The submucosa consists of an intensely cellular tissue. The cells form no histological structures, and there is intense infiltration of the adjacent tissues. The cells are rather large, very vascular, showing numerous nucleate and many mitotic cells. There is considerable vascularity. Diagnosis: Sarcoma of the reticulum lymphoid-cell type. Apparently of very high degree of malignancy. This patient then received eight radium treatments between June 27, 1929 and Feb. 25, 1930.

Two months after admission, after two radium treatments, the X-ray reported: No definite metastasis to lung at this time.

On Jan. 27, 1931, 20 months after original specimen report, and 11 months since the last radium treatment, another specimen sent to laboratory brought the following report: The specimen consists of a small tag of tissue. Microscopic section shows a slightly hyperkeratotic and thickened mucosa, which is, however, well orientated. The stroma consists of edematous connective tissue. Diagnosis: Polypoid tissue; no signs of original tumor tissue remaining.

Frontal Sinusitis; Extradural Abscess. Dr. M. N. Jasper.

C. K. (No. 749020), a white boy, age 16 years, was admitted to Dr. Faulkner's service, Jan. 28, 1931, complaining of a mild intermittent frontal headache of three or four days' duration, following a head cold. Clinical examination showed nothing significant and the X-ray examination reported mild involvement of all sinuses, more particularly of the left antrum. The patient was given the usual palliative treatment, and when seen two days later stated that he had no further trouble.

He returned to the clinic on Feb. 13, 1931, with a large swelling above the right eyebrow. There was no pain, no tenderness, no redness, no fever; but there was very decided fluctuation. Aspiration brought out thick pus, from which short and long-chain streptococcus was cultured. The Wassermann and Kahn tests were negative.

On Feb. 20 the patient was operated on through a Killian incision. There was erosion of the outer table of the frontal bone about the middle of the swelling, and an extradural abscess about an inch to the right. There was also a large perforation in the anterior wall of the right frontal sinus near the median line. The condition of the bone was such that a bridge was deemed inadvisable and the entire anterior wall was removed. Recovery was uneventful.

Presentation of Case. Dr. H. G. Bullwinkle.

This patient, P. D., who I am presenting tonight is 19 years old and by occupation a waitress. She came to the clinic at Manhattan Eye, Ear and Throat Hospital, gave as her complaint enlarged glands at the angle of the jaw; duration, 10 years. These glands began first on the left side and increased slowly but progressively in size, and nine years ago the same condition appeared on the other side of her face. Her tonsils have been removed. There is no history of any similar condition in any member of her family.

She gives no history of, and has no clinical evidence of, any sinus infection. Her general health has always been excellent. There has been no loss of weight in the last two years. In fact, she has gained weight.

An X-ray of her lungs has been taken and is absolutely negative. The blood Wassermann and Kahn tests are negative. The urinalysis is negative. The complete blood count is as follows: R. B. C., 4,170,000; hemoglobin, 70 per cent; W. B. C., 5,800; polys. lymphos., 67 per cent; S., 22 per cent; L., 8 per cent.

Examination shows these glands to be firm, well encapsulated and freely movable, there being no attachment to the underlying tissues and overlying skin. When seen in conference at the Manhattan Eye, Ear and Throat Hospital the general feeling was that we were dealing here with a mixed tumor of the parotid gland, bilateral in type. I expect to remove these tumors very shortly from this patient and hope to be able at the subsequent meeting of this Section to report to you the results of the pathologist's examination, possibly to show you a slide or two at that time.

Etiology and pathology—Mixed tumors: Their origin is questionable. They are benign and vary histologically as distinct from carcinoma and sarcoma. Ewing on etiology: 1. No single source meets all requirements. Some are adenomatous and arise from acini and ducts of the gland in which they are encapsulated. Others are encapsulated and extraglandular and take the form of basal cells or adenoid systic epithelioma. These probably arise from misplaced embryonal portions of the gland tissue. Bronchial remnants may possibly be connected with this group. 2. The derivation of mucous tissue and cartilage from the gland epithelium has been satisfactorily proved.

Wood writes that they are a peculiar group of tumors, not closely related in morphology with any of the last named type of tumors. They come under the fibroid epithelial group, but may also arise from malformations and displacements during embryonic life, and some are sometimes classed with the teratoid tumors.

Fry states that they are really not mixed, but are entirely epithelial in origin and the mucinous material which is such a prominent feature in most of these tumors is a secretion of mucin by the tumor cells and this is only an addition of the normal function of the gland cells. He also stated that some of the tumors show varying degrees of malignancy.

Ewing further states that pure malignant epithelial tumors of the salivary glands are by no means rare. Carcinoma usually develops rapidly and while at first it may be encapsulated it soon invades the whole gland, the capsule and the regional nodes. After extirpation recurrence is usually observed with metastasis to bones and lungs.

Occurrence: Any age. Sex equally divided.

Signs and symptoms: Duration: average, seven years. Pain, usually none, unless malignant, and is usually due to pressure upon the fifth nerve because of the size of the tumor. Size: Average, that of an English walnut. The smallest, the size of a peanut, the largest weighing 26 pounds. Consistency: hard. Treatment: Surgical, radiation purely palliative.

Operative treatment: Best to have immediate frozen section done. Then, if benign, the facial nerve will not be needlessly sacrificed; but if malignant, should be sacrificed if necessary without a moment's hesitation and a very extensive removal of the entire parotid gland, together with a complete neck dissection, should be done. When operating encapsulation should be noted as this usually means that the tumor is benign. Care should be taken not to rupture the capsule in removing, as spilling of the contents may be the source of a recurrence. In operating malignant tumors, ligation of the external carotid artery and the internal jugular vein may be necessary.

Prognosis: Recurrence: Mixed tumor by recurrence is almost always benign. Rarely a recurrence will be malignant. These tumors may recur up to five years after the operation. As a rule mixed tumors never metastasize. Carcinoma prognosis very bad, local recurrence usually very prompt, that is, within a few months. Sarcoma prognosis also bad, although not to the same degree as carcinoma. Radiation: Practically valueless in this condition.

Abscess of Thyroid Gland. Dr. D'Arcy McGregor and Dr. John Loré.

Patient, a while female, age 30 years, married, applied at the Manhattan Eye, Ear and Throat Clinic, service of Dr. White, on Feb. 19, 1931. Chief complaints were: 1. Pain and swelling of anterior region of neck. 2. Difficulty in breathing. 3. Difficulty in swallowing. 4. Chills and sweats. 5. Unproductive cough. Duration of symptoms, one week. The past history was negative, the patient giving no previous history of throat trouble.

Present history: On Feb. 13, 1931, following an attack of grippe, patient developed a sore throat, followed by pain and swelling of the anterior region of the neck, localizing around the region of the thyroid gland. The swelling increased laterally and upward and a stiffness of the neck muscles followed with chills and sweats. The condition persisted for about five days, when the patient developed difficulty in breathing, and was referred to the hospital by her family physician for diagnosis and treatment. Admitted to ward. Physical examination showed marked induration and swelling of the anterior part of the neck, extending from the submental region down to the supraclavicular fossa. The skin was tense, painful to the touch and showed areas of redness. The pharynx and larynx were negative, but subglottically, on the anterior wall of the trachea, a rounded mass was seen, which seemed to fill one-half the lumen of the trachea and appeared to be covered with a whitish exudate. Temperature, 101.6°; pulse, 120; respiration, 24; white blood count, 18,800; polys., 88 per cent; small lymphocytes, 12 per cent. Urine showed slight traces of albumin and indican.

It was decided to operate immediately and under local anesthesia of novocain; a field block was performed and a midline incision from the cricoid cartilage to the supraclavicular fossa was made. Upon exposing the thyroid gland its capsule was found to be tense and of abnormal color, while just above the isthmus a perforation of the capsule was seen, which led into the substance of the thyroid gland. Incision into the capsule and gland revealed areas of yellow purulent material and broken-down gland tissue, which extended laterally into either lobe of the gland, and posteriorally it was found that the pus had burrowed through into the trachea, making an irregular perforation about one-half c.cm. in diameter and allowing the free passage of air in and out. The wound was packed lightly with iodoform gauze and the patient made an uneventful recovery. The perforation in the trachea closed in about six days and the wound granulated up to the present condition. Smear and culture at the time of operation showed staphylococcus aureus and streptococcus viridans.

Thyroiditis or inflammation of the gland is always secondary to some infection; may be simple or purulent. It occurs with typhoid fever, measles, smallpox, pneumonia, rheumatic fever and influenza. It is a rare complication after tonsillectomy. Pathology: Gland studded with numerous purulent foci. Complications: Rupture into trachea or esophagus; metastatic abscess in cervical region. May perforate into a lung, causing septic pneumonia, or get in the large vessels of the neck and cause pyemia. Myxomedia or hypothyroidism has followed destruction of glandular tissue by suppuration.

DISCUSSION.

Dr. L. Glushak: I have observed a similar case of abscess of the thyroid which opened in the left pyriform fossa. The patient had a similar history to the one reported by Dr. D'Arcy; had been sick for about three weeks, getting worse; showing an induration limited to the thyroid gland, which was outlined on the neck, high temperature, etc. A general surgeon was handling the case, and called me in before cutting down into the deep structures of the neck from the outside. On laryngeal examination I found a white slough and swelling filling the left pyriform fossa. Under direct laryngoscopy I probed the swelling and discovered the abscess, which I opened there and drained. The patient recovered promptly.

Dr. Bullwinkel: I understood that the patient had pus in the superior mediastinum. If so, is that a mediastinitis and not all air bubble?

Report of a Case of Retropharyngeal-Esophageal Abscess. Dr. Julius I. Klepper.

(To appear in a subsequent issue of The Laryngoscope.*)*

DISCUSSION.

DR. H. H. FORBES: I don't think this discussion ought to end without a comment on the subject of the retropharyngeal abscess. I am sure there is not a man in the room who has not been taught to look for a retropharyngeal abscess in an infant or child with dyspnea and how any pediatrician can treat such a child without a careful examination is beyond me.

DR. JULIUS I. KLEPPER: This condition was called retropharyngeal-esophageal abscess and not mediastinitis, because the abscess was behind the clavicle, extending down to the superior mediastinum. You can see this from the X-ray. Though this was also a very severe condition, it would surely have been fatal had it been mediastinitis. Probably there have been many more cases like the one presented that have not been reported and did not show the above as clearly in the X-ray shown. In our case the X-rays were taken at least 36 hours before the child was operated upon. Dr. Forbes suggests that this be called a retropharyngeal abscess only. May I point out to him that the pharynx ends at the sixth cervical vertebrae and the esophagus begins here behind the cricoid cartilage? The pictures clearly show that the abscess reaches the second dorsal vertebrae and on a plane behind and below the clavicle; for this reason we called the case a retropharyngoesophageal abscess. In the paper read I mentioned the fact that the family physician did refer this case as a retropharyngeal abscess to two laryngologists and a well known pediatrician. The question in their minds was not only one of diagnosis but of prognosis, all of them feeling that the child would not survive.

Report of a Case of Tuberculous Laryngitis Treated with Artificial Sunlight. Dr. M. L. Harris.

(To appear in a subsequent issue of THE LARYNGOSCOPE.*)*

DISCUSSION.

DR. H. H. FORBES: I think the Doctor should be congratulated on this case. If you relieve the dysphagia in a case of tuberculous laryngitis it is most decidedly beneficial; and if that can be done by this light treatment so that the patients can be fed and so bring up their general nutrition, it is a decided advantage.

Case of Severe Cardiospasm Mistaken and Treated for Carcinoma of Esophagus. Dr. JOS. W. MILLER.

(To appear in a subsequent issue of THE LARYNGOSCOPE.*)*

DISCUSSION.

DR. H. H. FORBES: With all the bronchoscopy and esophagoscopy now being done in the city I don't see how a case of this type could go so long without some one of our Section getting a tube down his esophagus.

Report of Three Cases of Diseased Inoperable Tonsils Eradicated with Radium. Dr. J. Coleman Scal.

(To appear in a subsequent issue of THE LARYNGOSCOPE.*)*

DISCUSSION.

DR. MARVIN JONES: These cases should not be permitted to pass without some comment. The first case was cited as inoperable. Age 60 plus; the refusal of the patient does not class this case inoperable. This type of case should not go on record as being inoperable. The X-ray, radium and electrocoagulation methods reduce lymphoid tissue and leave a smooth surface if properly manipulated. This smooth surface covers lymphoid tissue and infected crypts. I have proven this to be the case in the first two methods and I believe it is true of the last. The impression is gained of a completely removed tonsil when in reality it has onl ybeen hidden. I believe the resultant condition, as in any buried tonsil, is more dangerous than the original. We have proven in our series that these remnants do contain infective material. I thought that X-ray and radium had been relegated to their proper receptacle, but they seem to revivify ocassionally. I thought that the use of electrocoagulation had stolen the affection from those few doctors who continually excuse themselves by the phrase, "inoperable tonsil."

DR. J. G. SCAL: The inoperable cases referred to were hemophiliac, cardionephritic and elderly persons; the first case mentioned being 61 years old and the second 70 years old, and very few of us would care to do a tonsillectomy

on such patients. I found that the radium acted by eliminating the lymphoid tissue of the tonsil, leaving only its fibrous structure, the end-result being a small fibrous mass. In the contraction of this fibrous mass, practically all the material in the crypts are eliminated and the tonsils made inocuous. The lack of success with this method lies in faulty technique. The radiation must be repeated and unfiltered radium emanation never used in the tonsils. I use only the platinum removable seeds. I still maintain that tonsillectomy is the proper procedure; but only in those cases that will not submit to operation or are inoperable, that radium is the choice.

Modification of the Lautenschlaeger Operation for Surgical Treatment of Ozena. Dr. A. Wachsberger.

(To appear in a subsequent issue of THE LARYNGOSCOPE.*)*

DISCUSSION.

DR. J. I. KLEPPER: In regard to the criticism of Dr. Wachsberger's paper, let me say I saw the case Dr. Wachsberger presented and should be satisfied if I would average as good results in some of my cases as he got in the case presented here tonight.

DR. L. GLUSHAK: On examining the case we found both nasal fossae filled with adhesions between septum and lateral wall from front all the way back with a crusty, purulent discharge in the posterior superior region. On the question of the diagnosis of her condition it is difficult from the present appearances to draw any conclusion except that the patient states she herself smelled the foul odor from her nose before the operation. This is usually not in accordance with an ozena as the patient himself is not conscious of any odor from the nose. As to the modification of the Lautenschlaeger operation, one cannot see how it is possible to move the entire lateral wall of the nose along with the edge of the pyriform fossa without injuring the nasolachrymal duct. The anterior edge of the pyriform fossa is so thick and brittle, and especially in the ozena patient, that one is apt to splinter it in the endeavor to dislodge it from its situ. The patient presented tonight is beginning to show already some recession of the mucous membrane with discharge in the posterior superior region of the nose and nasopharynx; in other words, the beginning of the return of the previous condition. With all the adhesions present, the patient would have great difficulty in clearing the nose, which of necessity she will have to resort to, and which she will not be able to carry out as efficiently as she did before the operation.

DR. S. J. KOPETZKY: It is very interesting to listen to a man criticize a report from a theoretical angle and tell us what might happen and would happen, and then observe the case and see what did happen. I may add that I have observed this case of Dr. Wachsberger's and know that the procedure he advocates can be done, and he is doing it; and the patient here this evening is proof of it. As he stated, later on he will report a series of such cases, when enough material has been accumulated to warrant it. In a general hospital such as the one from which we have been reporting these cases, the question of ozena is a very disheartening and discouraging one; and if any one of us develops a procedure which does away with odor and makes the patient more comfortable, that man is doing a public service as well as advancing rhinology; and if Dr. Wachsberger's modification of the Lautenschlaeger accomplishes the results that these few cases seem to indicate, it is well worth while, all theoretical objections to the contrary notwithstanding. I hope you will all keep your minds open for a free discussion of the final report, based on an adequate number of cases.

DR. A. WACHSBERGER: First, as to whether it was a case of true ozena. The diagnosis was unquestionable. Second, regarding the mobilization and subsequent moving of the pyriform crest. Someone has said this is impossible. Nevertheless, I have repeatedly done it; and did it in this particular case, which several rhinologists saw before operation. Many of you have seen the patient this evening and can estimate the outcome yourselves. This is one of the best results I have had. The patient now has neither crusting nor odor. As I have said, it is only four months since the operation; but usually when there is a recurrence of symptoms it takes place within six weeks or so.

THE MINNESOTA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY.

SECTION OF OTOLARYNGOLOGY.

Meeting of Feb. 13, 1931.

Dr. John Brown, President, Presided.

A New and Effective Nonsurgical Method for the Treatment of Chronic Suppuration of the Middle Ear. Dr. Charles Hymes.

DISCUSSION.

DR. HORACE NEWHART complimented Dr. Hymes on his success in clearing up suppurating ears. He himself had used zinc ionization and the regular classical treatment for suppurating ears, of cleansing and instilling bor-alcohol, with only fairly good results. After trying the potassium iodid and boric acid insufflations on a limited number of selected cases he had had very satisfactory results, some ears clearing up after only two or three treatments. While he could not agree with all the essayist said in quoting Dr. Beck and others as to the needlessness of radical mastoid operations, Dr. Newheart said he believed that with this treatment one had a means of making a definite diagnosis as to whether or not a radical mastoid would have to be done. Cases having a persistent foul discharge after a fair trial of thorough cleansing and insufflation of potassium iodid and boric acid should be advised to submit to operative procedures. He had seen sufficiently large cavitation in the mastoid to satisfy him that no external treatment could cause a permanent cessation of the discharge, and called attention to the old dictum that when there is pus coming from the middle ear no man knows when, where and how it will end.

DR. HYMES (in closing) thanked Dr. Newhart for his discussion, stating that Dr. Newhart's opinions come from a larger experience than his own. Dr. Hymes said he heartily agreed with Dr. Newhart that in these cases conscientious effort should be made to clear them up without radical surgery and this should be continued over a sufficiently long period so that one is definitely certain the ear will not respond. He felt there was no question but that sometimes the X-ray does not reveal small cholesteatomata, and such cases naturally would not respond to local treatment. Dr. Hymes said the point he was attempting to bring out in his paper was that a great many of these cases are operated upon in which one expects to find a cholesteatoma and necrosis, and at operation the surgeon finds nothing. These are cases of chronic suppuration with marginal perforation and the surgeon had operated them in the past with the idea of doing away with possible intracranial complications. He felt that with this local treatment many of these cases will be saved a radical mastoid operation. As regards bony necrosis, he had found in his experience that this does not exist as often as he had previously thought. In many of these cases where the radical mastoid has been performed, approximately one-half will continue to show chronic suppuration. When he was in Budapest about three years ago he had talked with Dr. Wein, otologist of the University Clinic, who said he followed his radical mastoid operations by the instillation of boric acid powder; every case was dressed aseptically after the operation and he was able to dry up these mastoids in 90 per cent of his cases, believing, as he did, that it was a mixed infection which caused the chronic suppuration after the operation. The new epithelium lining the mastoid cavity after the radical operation has a tendency to exfoliate. Secondary mixed infection sets in and chronic suppuration is the result. Dr. Hymes had been able to clear up ears that were discharging for some months following radical mastoid operation. He recommended the use of his treatment postoperatively following the radical operation. He felt that one could almost promise the patient a dry ear following radical mastoid. Radical mastoid has its place in some cases and nothing will supplant it as there is no way of getting rid of bony necrosis and most cholesteatoma other than through the radical mastoid operation.

Case Reports. Dr. Kenneth Phelps.

Dr. Kenneth Phelps reported three cases, as follows: Case 1. Jerry, male, age 3 years, had never had a clear voice since he began to talk, though as a baby he had a loud cry. On admission to the University Hospital in September, 1930, he had aphonia and marked laryngeal obstruction. The diagnosis was papilloma of the larynx, for which a tracheotomy was done. Following this the tumors were removed, with blunt forceps, from his larynx and the base fulgurated, using high-frequency current. He regained his voice and was able to breathe through his larynx and the tracheotomy tube was removed. He was discharged and directed to be brought back for observation, which was done a couple of times and recurring tumors removed. After an interval the larynx again became occluded and a second tracheotomy required. Since January, 1930, he had been treated by means of X-ray. He is now being treated with further fulguration and his tracheotomy tube has again been removed.

Dr. Phelps stated that the subject of papilloma of the larynx in children is of interest because of the variety of cases seen. Some patients seem to make a spontaneous recovery, which would make one think that this disease was self-limited. Others, in spite of all treatment, persist in their recurring papilloma. There is some evidence of an infection being the cause, for it is known that a papilloma on the larynx will produce a wart on another person's arm if implanted there. Probably this condition should be considered a papillomatosis, meaning there is some underlying constitutional cause which we as yet have been unable to recognize.

Case 2: Tumor of the larynx in an adult. The patient was a male with epithelioma of the right vocal cord, for which a laryngofissure was done in April, 1930. The removal of this tumor was followed by treatment with diathermy, X-ray and radium. His voice is very good and he had been in good physical condition until three weeks ago, when a bilateral swelling of the cervical glands appeared. His larynx shows no local recurrence of the tumor. This patient had what was diagnosed as an intrinsic carcinoma and probably would have had these recurrences if a total laryngectomy had been done.

Case 3: The patient was a baby, age 7 months, who had been a noisy breather all his life. The right chest was opaque under X-ray, the trachea coming down in this direction (shown on film). Heart sounds were on the right side of the chest. Bronchoscopy was done, using an infant-size tube, and as nearly as Dr. Phelps could tell there was no bifurcation at all. He therefore concluded there was some form of congenital anomaly. The child developed pneumonia and died, and it was found at autopsy that the child had no right lung at all. The specimen was shown. The chest was filled with heart, thymus and mediastinal contents, bound down with adhesions all around. There was just a tiny sort of bud on the right side representing the right lung.

DISCUSSION.

Dr. John Brown said that this last case of congenital anomaly was one of the most peculiar things he ever heard of. He had been somewhat interested in comparative anatomy and in that study there was only one group of animals with one lung, and that is the snake group. That would carry one a long way back in atavistic tendencies if he cared to go back that far.

Dr. Phelps (in closing) stated that statistics on intralaryngeal removal of carcinoma are rather discouraging. Figures show a complete cure in less than 20 per cent of cases and a recurrence in about 40 per cent of cases. Most authors advise against intralaryngeal removal of carcinoma.

The history of laryngofissure is quite interesting. About 40 years ago men had from 15 to 20 per cent of operative deaths. Now there are many series of cases, all the way from 50 to 100, with no deaths. Cures result in as high as 80 per cent of the cases. Total laryngectomy results in about 50 per cent cure and 50 per cent recurrence. Operative deaths average about 5 per cent since 1913.

Extrinsic carcinoma of the larynx had best be treated by radium or X-ray. Fielding Lewis, of Philadelphia, reports some cases of extrinsic carcinoma of the larynx treated by radical surgery with success.